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USEFUL ARTS, INTERNAL IMPROVEMENTS, GENERAL SCIENCE,

AND THE RECORDING OF

AMERICAN AND OTHER PATENTED INVENTIONS.

DECEMBER, 1828.

Directions for bending, blowing, and cutting of Glass, for chemical and other purposes. Extracted from Chemical Manipulation. By Michael Faraday, F. R. S.

(Concluded from p. 306.)

64. The *cutting of glass* in the laboratory, is an operation which is more frequently to be performed with tubes and rods, than any other form of glass. But, occasionally, oil flasks, retorts, jars, &c. are required to be cut into useful pieces, and several methods have been devised for the purpose. These, though not at all equal in accuracy and security, to the methods of the glass-worker, may be performed with such common tools as are to be found almost every where, require but little practice, are frequently efficient in facilitating experiments, and are highly useful to the student.

65. The method of cutting tubes or rods by a file, has been already described. (19) A cutting diamond will answer the purpose as well as a file, and even a sharp flint may be used, upon emergency. When a tube is very large, it is safer to go round the place, first with a diamond, and to perform the operation over a cloth, or some other soft substance, lest, as the pieces separate, they should fall and be broken.

66. In all cases in which a diamond is used, it must be remembered that a cut, not a scratch, is required. A scratch by a diamond, will rarely give direction to a crack, and is as likely to be crossed by one, as followed. A cut, on the contrary, is a division of the glass, independent of the abrasion, has actually penetrated some depth,* and is almost certain to be followed by any crack, or entire

* See Wollaston, Phil. Trans. 1816, p. 265.

division, that may come across, or even near to it. A cutting diamond operates well, only in one particular position, which should be formed by a trial upon a piece of crown glass, and, being ascertained, should be marked upon the handle, that in any future operation, it may always be in the same favourable position relative to the cut that is to be made. The scratching diamond is not fit for cutting, but is intended for distinct uses; nor should a cutting diamond be injured by employing it in writing and scratching upon glass.

67. Old retorts, flasks, globes, and other convex pieces of glass apparatus, are often cut by iron rings, into circular pieces, which then answer the purpose of dishes. The rings should be of different diameters, made of wrought iron, about the third of an inch in thickness, with a stem attached to them, by which they are fixed into a wooden handle. When made uniformly red hot, and brought into close contact with the convex surface of a glass retort or flask, a crack generally takes place, in a few moments, beneath the ring, which occasions the separation of the inner round piece. These pieces are sometimes used as evaporating basins; but, from their great tendency to crack, at the edges, and, gradually, to break to pieces, they are not safe in precise or important experiments. The rings are much more valuable for the facility with which they cut a flask in half, or, by similar operations, afford entrance into any other vessel, so as to allow of an examination of the interior, and the state of the substances it contains.

68. Thin fragments of retorts, flasks, and, especially, Florence flasks, are very useful for the evaporation of small quantities, but as these vessels are never required to be thus cut up, until they are broken, the cracks then existing, may by other means be led in advantageous directions, more conveniently, than by the iron rings.

69. Many pieces of glass apparatus, which have become useless, such as jars, bottles, globes, and, generally, those with convex surfaces, may be divided along a particular line, by means of a hot iron rod, and thus separated into useful pieces. The operation consists in leading a crack, either made for the purpose, or previously existing, according to the required direction. The iron rod may be nearly as thick as the little finger, and made tapering at the end, for an inch, or an inch and a half, to a blunt point. The line of division should be decided upon, and even be marked on the glass, with pen and ink; it may pass, without impropriety, over parts varying in thickness, but should not go suddenly from a thick to a thin part; thus it may be followed with ease, round the sides of a jar or bottle, but the crack could scarcely be led down one side of a jar, across the bottom, and up the other side.

70. It will rarely occur, that a vessel is to be divided, in which some previous crack, or broken edge, does not exist. The iron, being heated to redness, is to be brought with its point towards the crack, in an opposite direction to it, and the apex is to be laid upon the sound glass just before the crack, the iron rod being, at the same time, retained at an angle of about 20 or 30 degrees with the, as yet uncracked, glass beneath. The crack will immediately extend it-

self to the part of the glass with which the hot iron is in contact; and by gradually and slowly drawing the latter along the glass, before the crack, the division will follow it, and may thus be led in almost any direction. It may, when not carried too near to the edge of the glass, or to another crack, be made to turn off suddenly at right angles to its former course, or it may be led in gradually winding and curving lines. The crack should at first be led directly towards the line which marks the convenient division, and having reached it, that line is to be pursued until the separation is effected. When the rod has cooled considerably, or even when hot, if thin glass be experimented with, it is often difficult to carry the crack entirely round into the commencement, or into any other division; but in such cases, the small part which remains undivided, easily yields to the slightest mechanical force, the crack being then continued directly into the previously divided part.

71. The rapidity with which a division is effected, depends upon the temperature of the rod. It is not desirable to perform it very quickly, and, therefore, when very hot, the rod should be held at greater angles with the glass, than those mentioned, that the point only may touch it. As the heat diminishes, the rod should be more inclined, that the thicker part may be made to approach the glass, and by its heat and effect, compensate for the diminished temperature of the point. When still cooler, it may be desirable to use the thickest part of the rod instead of the point, laying it down in contact with the glass, before the crack, and drawing it along, but this can only be done on convex vessels.

72. If the direction to be followed, lies but a little distance from the line of an edge, or a previous division, the operation must be performed more slowly, and with the apex rather than the line of the rod; for the crack to be led has then a tendency to fly suddenly to the edge by its side. It is not easy, by this method, to cut nearer to an edge than the third or fourth of an inch.

73. If there be no crack to commence with, one must be produced in the following manner. If possible, an edge is to be selected, which, being an inch, or an inch and a half, from the line of division, may have a crack made in it without interfering with the part of the glass intended to be preserved; if it be a recent edge, viz. one that has been formed by fracture, rather than one which, existing at first on the piece of apparatus, has been fused, it is the more advantageous. The heated iron rod is to be applied to this edge, in a direction almost perpendicular to the glass, that the heat may extend to as little a distance from the place as possible, and when it has been in contact for a moment, if a division have not spontaneously occurred, the hot part is to be touched by a moistened finger: a crack will immediately be occasioned, and the smaller the distance to which it runs from the edge, the better; for once commenced, the smallest crack can be led as easily as the largest, and the opportunity of directing from the commencement, is secured. If the glass be thick, as that of a bottle or jar, it will usually fly by the heat alone; if it

be thin, as that of a Florence flask, it will, generally, require the application of moisture, after the heat.

74. If the crack is to be commenced in the middle of a plain, unbroken surface, great care is required, or the fracture will extend to a considerable distance, and, probably, in a wrong direction. The heated point should be applied to a single spot, and being soon removed, the place should be moistened. It is better to try two or three times unavailingly, than, by heating the glass too much at first, to incur the risk of an extensive fracture. The crack should always be commenced at some distance from the important line of division, that there may be less danger of the first and uncertain separation interfering with or crossing the latter.

75. In all divisions of this kind, the glass to be cut should be supported upon a cloth, that the parts on both sides of the crack may be sustained; or, when the division approaches its completion, the mere weight of one part may make the crack run in an inconvenient direction. The form of the piece of iron, is by no means essential, and a furnace poker, or a pair of tongs, in cases of emergency, may be used for these purposes. It may even be performed with a red-hot pointed piece of charcoal, the ignition being heightened by blowing upon it.

76. The edges which are exposed when glass is thus divided, are very liable to fracture by slight mechanical force, by heat, or by other causes, much more so, indeed, than glass of which the edges have been fused or ground. Hence, it is frequently advantageous, either to grind them, which may be done upon a flat stone with a little sharp sand, or emery, and water; or to soften and fuse them, which may be effected either by the table blow-pipe, bringing all parts of the edge in succession into the flame, or by a flat charcoal fire. When the edges are not thus finished, they should have a sand-stone, or a fine file passed over them, to remove the linear angles, which, being sharp, are dangerous to the fingers.

77. Jars which have been broken at the edges, may, by a process of this kind, be cut shorter, and then will long remain useful vessels. Bottles, of which the necks or upper parts have been broken, may be converted into small jars. Their stoppers should be added to those which already occupy a drawer in the laboratory, (84) and from which the place of an absent one may often be supplied. Broken test glasses may often be cut into useful forms; if but one-half or two-thirds of the cup be removed, the remaining part, with the foot, will serve for many voltaic decompositions; and, frequently, as a convenient insulating stand, in electrical experiments. If nothing but the foot can be preserved, still there are numerous occasions for its services in the laboratory; for the body being broken away, and the stem chipped off, which is done by striking it sideways with a file, or the edge of an iron spatula, a strong round glass disk remains. Such disks are very convenient as covers for the mouths of glasses containing precipitates, or other substances, to exclude dust during the time the experiments are in progress.

78. In cutting up large pieces of glass, by the method described,

especially if any importance be attached to the result, it is best to precede the application of the hot iron, by going round the part with a diamond. The iron then merely completes what the diamond had begun, and it is seldom that the separation departs from the track thus laid down for it. But the chemist should never undertake delicate or difficult divisions; the object of the preceding directions is, to enable the economical experimenter to cut up into useful forms, old glass which would, otherwise, be thrown away as waste. In more important cases, he will, of course, transfer it into the hands of an instrument maker.

79. Sometimes it is required that a piece of flat glass, as crown glass, should be broken into two or three smaller pieces. If this be attempted by means of a blow, the glass will, usually, shiver into many pieces, mostly long, with round edges, and of very inconvenient forms; a piece of the desired size or shape being rarely obtained. But, by contrivance, a piece of such glass may be divided into two parts only, with considerable certainty; the direction of the fracture also, being in some degree under government; and a long slip of glass may be divided into halves or quarters, or a piece of any form cut up into smaller parts, without difficulty. Suppose it were required to divide a piece of glass four inches long and two wide, into two nearly equal portions. An angular file (three-square or four-square) is to be placed with one end against an obstacle, as the edge of a table, and the other against the breast, so that by a little pressure, it may be supported with one of the edges upwards, and nearly in a horizontal line. The piece of glass is to be held with one end in each hand, and the middle of one of its long sides is to be applied to the edge of the file at that end nearest to the table or support, the glass being inclined a little upwards from the horizontal direction towards the operator. The operator is then to press with a moderate degree of force on the glass, drawing it along the file, from one end to the other, and, without taking it off, to turn it as it were over, so as to incline it in the opposite direction, and then carry the glass back again with about the same pressure, to its original place on the edge. In this way there is a tendency to notch the glass on the opposite sides of the same edge and place, which is sufficient to originate a fracture there, and as the glass is returned, it generally divides in the hands by a crack, commencing at the place where it was in contact with the edge of the file, and proceeding directly across between the hands.

The degree of pressure required, is quickly learnt, by a little practice on waste pieces of crown glass; it should be insufficient of itself, to break the glass, but sufficient when the small fracture is commenced by the file. It is better to make it rather stronger when the glass is returned, than when drawn towards the body; the former being the most convenient time and position for the fracture to take place in. The direction of the crack is regulated, chiefly, by the force applied by the hands, being usually across the line of resistance to that force; and hence, the opportunity afforded of giving it a direction by pressing with the hands equally on each side of the

line, along which it is desired the crack should pass, at the same time making it commence at the beginning of that line, by placing it on the edge of the file.

80. When all other means of directing a crack are absent, it may frequently be done with advantage, merely by the pressure of the nail. If a Florence flask be cracked, the division may be extended by putting the thumb over it, near the end of the crack, by pressing the nail when in contact with the glass, and carrying the thumb forward. The crack will fly before it, extending, on this side or on that, according to the direction in which the thumb advances, or according as the pressure is on one side or the other. The flask may thus be divided into pieces, much more useful than such as would result from crushing or breaking it entirely at random.

81. Pieces of glass are reduced at the edges in various ways. The corners may be removed from fragments of plate glass, by running a coarse file, with a light and rasping kind of motion, against the edges, in a position slightly inclined to the glass. The reduction takes place, not by mere attrition and wearing away, but by the removal of successive chips of glass, each tooth of the file carrying away a small fragment, perhaps the eighth or tenth of an inch across; in fact, of a diameter equal to the whole thickness of the plate. In this way, the large pieces are soon brought into a round form, and serve as valves. In the same manner, if, in cutting a thick tube, the aperture should not be level all round, the projecting parts may be removed piecemeal; but more care is required than with flat glass, from the tendency of cracks to form at the edge and fly up the tube.

82. The edges of plate glass may, also, be removed by a pair of pliers, not by pinching off the superabundance, but by bringing it between the chops of the instrument, holding it lightly there, and then twisting the pliers slightly, so as to exert a degree of pressure upon the exterior edge of the glass by one of the sides, whilst the other merely serves as a fulcrum for support to the power. The edge will be found to splinter and crumble away under a force thus applied, and the art of successfully using it is soon learned by practice. This method is not so applicable to the edges of tubes as to straight glass, but may often be used with crown glass, when the file is inapplicable.

83. Glass may be ground on almost any flat stone with a coarse grain, by means of a little sharp sand and water, or, better still, by emery and water. Thus the ends of the tubes, (76) may be ground level, on a piece of Yorkshire or Purbeck stone. The operation is easy, in proportion to the smallness and thickness of the tubes. It requires that the glass should be held with a steady hand, and perfectly upright, that the resulting edge may be flat. Larger vessels, as jars, &c. may be ground in a similar way, but are better trusted to the instrument maker.

84. When a bottle requiring a stopper, has been fitted with one from the stopper drawer, (77) it may happen that, though nearly so, it is not quite true and tight. In such a case, the stopper may be made to fit accurately, by being ground with a little sea sand, or

coarse emery, and water, into the mouth of the bottle; during which operation, it should be quickly inserted into, and removed from its place, and turned at the same time. In this manner, the glass is in part worn away, and the stopper made tight; but care should be taken that during the grinding, the bottle be shifted a little now and then in the hand, that different parts of the neck and the stopper may work against each other at different times, and thus mutually correct the existing inequalities.

On the Combination of a Practical with a Liberal course of Education.

By W. R. Johnson, *Principal of the High School of the Franklin Institute.*

No. VI.

Next in importance to the office of *teacher*, in the High School, is that of honorary monitor, or *tutor.* This post is, at present, generally assigned to those students, who, having been for some time members of the school, have exhibited the best character, the most regular attendance, and the greatest aptitude in discharging monitorial duties. They must have attained the age of fifteen years, have sustained a high rank in their classes, and must engage to remain at least one year from the time of their appointment.

The tutors are allowed to attend any branches of study pursued in the school, free from all charges for instruction. They enter the school room, by a private passage, and have access at hours when other scholars are excluded. Their accommodations for study, at separate tables, are superior to those enjoyed by ordinary scholars. For their movements about the building, they are allowed a certain discretion, compatible with the proper discharge of their duties, and with the confidence which they are found to merit. As unblemished integrity is required in those who become candidates for the office, so the treatment towards those who continue to sustain that character, is such as we accord to ingenuous young men, rather than to mere boys.

But as this is an office of much responsibility, any misconduct, remissness, or even indifference to duty, in the incumbents, is regarded as a more serious offence, than in any other class of students.

It is the duty of tutors, to be present at the opening and closing, as well as at all other hours of the school; to observe the conduct of scholars, and note all irregularities which may occur in the passages, or elsewhere, about the building. They assist in transferring the notes of monitors from the small slates on which they are kept, to the journals of the teachers, and at the end of each half quarter, copy the results, exhibited by those journals, into the register, and aid in making out the merit rolls. When required by the arrangement of classes, they act as division monitors, in any department in which they may be found qualified to give instruction. A *section*,

composed of two or more *divisions*, is sometimes committed, during a recitation, to the charge of a tutor, who examines both monitors and pupils, and reports to the teacher the result of his inquiries. While divisions are reciting to their monitors, the tutors render important services, by passing from one semicircle to another, and observing whether the prescribed methods be strictly adhered to. From their reports on this subject, and from his own observation, the teacher enters in his journal the credits deserved by the monitors for the discharge of their duties. When questions of importance concerning the conduct of scholars, happen to arise, or when disputes occur between students, the tutors, either by themselves, or in the presence of a teacher, examine witnesses, and report in writing, the facts of the case. Remarkable skill and manliness have sometimes been evinced in conducting these inquiries, and it is believed that they have seldom or never failed to elicit the truth.

The *class monitors* next claim attention. They are twelve in number, taken from the head of the merit roll. Their duties relate principally to matters of discipline, and are chiefly confined to the study room, where they are placed at desks somewhat elevated above the rest of the school, so as to command a full view of their respective classes. Each keeps a list of his class, on which he marks the absence and tardiness of its members, together with such notes of discredit for misconduct, as the teachers may direct. He likewise receives the certificates of excuse brought by the scholars of his class, from their parents or guardians, erases the marks to which they relate, endorses them on the back, and hands them to the principal, to be inspected and preserved. They are required to be particularly attentive to order at the time of opening and closing school, and are, in succession, appointed superintendents of order out of school, where they are charged to note all irregularities of conduct committed by scholars in the vicinity of the building, before and after the hours of instruction. They are, occasionally, appointed examiners to canvass the claims of different scholars who happen to be candidates for the same rank in a class or division. A certain number of credits is allowed to each class monitor, at the end of every half quarter, for the faithful discharge of his duties. This, with the distinction attached to the post, is, generally, sufficient to secure uprightness and punctuality.

The second twelve, from the head of the merit roll, are termed *adjunct monitors*, whose duties, like those of class monitors, relate wholly to the discipline of the classes, to the condition of the benches, desks, slates, books, pens, and all other utensils employed by their classes, and liable to be lost or destroyed through neglect or inattention. In the absence of class monitors, they also take charge of the class lists, and record the absence, tardiness, and misconduct of members.

The *ordinary, or teaching monitors*, are taken from those who excel in each branch, and who have, usually, made much greater proficiency in the subject, than the scholars over whom they are placed. In a few instances, however, especially where memory is

chiefly concerned, it has been found most advantageous to cause the monitor to learn the same lesson as his division, care being taken that he should know and understand thoroughly, the whole exercise, before going to his semicircle. Though the greater number of teaching monitors will, generally, be found among the *class* and *adjunct* monitors, yet the latter offices have no connexion with the former. The possession of the one, neither insures nor prevents the possession of the other. The number of pupils placed for recitation under each monitor, is from two to seven, and the number of monitors and divisions in each branch, varies, of course, with the number of scholars who happen to be engaged in that particular pursuit. In some branches, nearly twice as many scholars are taught immediately by masters, as are required to fill the places of monitors; so that in case of the absence of any monitor, a substitute can immediately be found. By this means, the powers of the monitor are, at the time of his appointment, perfectly known to the teacher, and all the acting monitors are far in advance of the divisions which they severally instruct.

ENGLISH PATENTS.

To JOSEPH TILT, *Merchant, for improvements in the Boilers used for making Salt, commonly called Salt Pans, and in the mode of applying heat to the Brine. Communicated by a person residing abroad.* Dated April 4, 1827.

IN the method first mentioned, in Mr. Tilt's specification, the salt-boilers consist of long cisterns of brick work, 30 feet or more in length, with double walls at a small distance asunder, between which, clays, or other substances impenetrable to water, are pressed down, so as to prevent the liquor from leaking through; and their bottoms are, also, made water-tight, in a similar manner. Within each of these cisterns, a hollow triangular prism of plate iron, is placed horizontally on one side, on a platform raised a small height from the bottom, and occupies its whole length, except a short interval at each end; but is so much narrower than the cistern, as to leave room for a long narrow trough, or succession of narrow troughs, being placed between its lower edges and the side walls. These troughs are only as high as the platform, so that they lie sufficiently low to receive the salt that will roll down from the inclined surfaces of the iron prism into them, as fast as it crystallizes, and drops on the iron plate, from its increased specific gravity.

It will be readily perceived, that the brine is to be heated by means of this hollow iron prism, and two methods are directed for this purpose; in the first of which, steam is employed, which is introduced into it from a steam boiler, of the common construction, by two tubes, that enter at one end of it, near the bottom, at the different sides of a low wall or partition, which runs lengthways in

its middle, from end to end, and whose chief office is, to sustain a coping, or projecting plinth, a small distance from the upper angle, to prevent the heat from operating too strongly in that part. Two other tubes proceed from the further end, to convey the steam either to operate in other salt pans, or by a chimney, into the open air; and a fifth tube runs out from it, close to the bottom, to carry off the water that will be formed by the condensation of the steam.

In the second method of applying the heat, a fire is made within the hollow iron prism, which, for this purpose, protrudes through the walls of the brick cistern, at one end, where it is furnished with furnace bars, and an ash receptacle, and with doors for the admission of fuel, and for the removal of ashes, similar to those used for the fire places of common boilers. The same longitudinal partition is used in this case, as before, so that, in fact, there will be two fire-places within the prism, or, what amounts to the same arrangement, the fire-place will be separated into two equal portions; a back of brick work is also raised at the end of the fire-place, a few feet within the boiler, and over this back, the flame and smoke pass to a large tube at the other extremity, which penetrates through the end walls of the cistern, and either conveys it off to act in producing evaporation in other boilers, or directly into a chimney.

The troughs before mentioned, which receive the salt as it falls down from the sides of the iron prism, when they are made the whole length of the cistern, are separated by partitions, into several square cells, in which the salt will be formed into lumps of a similar shape; and they may, also, be thus divided, when not small enough for a single lump of salt: in either case, they are perforated with numerous small holes, through which the water may drain out, when they are drawn up from the cisterns, after becoming filled with salt; and to facilitate this latter operation, cords are fastened to them, which extend upwards above the edges of the cisterns.

In describing the iron vessel within the cistern, as a triangular prism, we have varied somewhat from the original; which, by assimulating it to a roof, only implies that it has two sides; but in doing this, we think we have furnished a useful improvement to the patentee; as the sheet iron angular roof-like vessel would, with great difficulty, be made water-tight, or steam-tight, at its junction with the brick work, and would, after being used, be still very liable to leak in that part, an inconvenience to which the sheet iron prism would not be subject: and, in fact, the cavity within the cistern, which it produces, is, really, a triangular prism, as described in the original, but one of which the top of the brick platform constitutes one of the sides, or the base, instead of being entirely of iron, as we would recommend.

It is stated, in the conclusion of the specification, that several varieties of shape may be used, both for the cisterns, and for the iron roof-like heater; and, that the latter may, also, be made to constitute the bottom of a salt pan; while the former may be fabricated of several different materials, among which, wood is expressly mentioned.

In the figures that accompany the specification, the plate-iron heater is represented with angles of 60 degrees, and the level of the brine, as rising above it only a few inches. The subjoined wood cuts will, more completely, explain Mr. Tilt's invention.

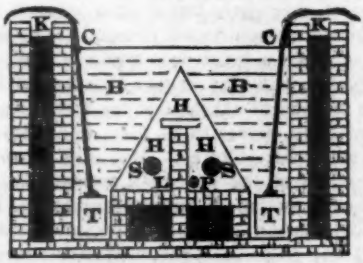
Fig. 1. Transverse section of the salt pan, as heated by steam.

B, B, Brick cistern, containing the brine.

H, H, H, Hollow iron roof-like heater.

S, S, Steam pipes entering into H, H.

Fig. 1.



P, Pipe for conveyance of water or condensed steam, from H, H.

T, T, Troughs for raising up the salt.

C, C, Cords for hauling up T, T.

K, K, Clay rammed between the double walls of B, B.

L, Brick partition in H, H, supporting a coping to equalize the heat.

Fig. 2.

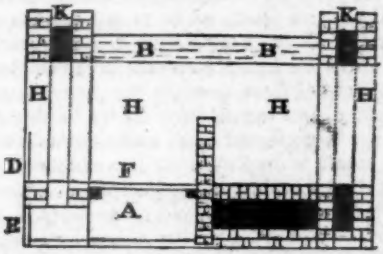


Fig. 2, Longitudinal section of the salt pan, as heated by a furnace.

B, B, Brick cistern containing the brine.

H, H, H, H, Roof-like heater continued through the double walls at each end of B, B.

D, Furnace door at one end of H, H.

F, Bars of the furnace fire-place.

A, Ash receptacle.

E, Door of A.

K, K, Clay rammed between the double walls of B, B.

OBS.—The principle used by the patentee, in his boiler, (of sloping its lower part, so that the salt may roll down off it into a recepta-

cle, according as it crystallizes and is precipitated,) has, before, been adopted by Mr. Josiah Parkes, in the salt boiler, for which he obtained a patent in December, 1823, (for which, see the 1st vol. of our present series, p. 281.)

Several of the remarks, which we made on Mr. Parkes's boiler, will, also, apply to the present one, particularly, those relating to the probable insufficiency of the slope, or inclination of its lower part, to prevent *all* incrustation, on account of the great attraction which the earths of the earthy salts, that are contained in the brine, have for the iron of this part; but it also appears to us, that the mode in which the above-mentioned principle is applied in the present boiler, will occasion a much less waste of fuel, than that used in Mr. Parkes's boiler, and that in this respect, an improvement is effected; and the method of taking out the salt from the pans, used by the present patentee, seems to us, also, to be more advantageous than that employed by Mr. Parkes. But still it appears probable, that much of the effect of the heat will be lost, and, of course, the fuel be proportionably wasted, in the present boiler, by the great inequality of its distribution; which the inclined sides of the iron heater must occasion; since in it the heat will, naturally, fly up to the upper angle, and be proportionably diminished at the lower parts; an effect, which the partition wall and its coping, used by the patentee, will have little or no power in preventing, though designed expressly for that purpose.

That the slope at the bottom of the salt pan, (or of the part of the apparatus which performs the same function, under a different designation,) will diminish the incrustation, though it may not entirely prevent this evil, we think to be extremely probable, and that, therefore, it will be well worth while to try various methods to obviate the inequality of the heat which it must occasion, as above stated; among which we would recommend the employment of several parallel longitudinal flues, beneath the iron heater, each having a separate fire-place, as a means very likely to have the desired effect, when the fire is preferred to be made immediately beneath this part: but when steam is employed for the evaporation of the brine, it appears to us, that a hollow triangular prism, such as we have before recommended, whose bottom, as well as sides, is formed of plate iron, might be made to have a similar effect, by confining the steam within it, by a loaded valve, so as to make it act under a pressure.

[*Repertory.*

To Charles Pearson, Esq. Richard Witty, *and* William Gillman, *Engineers, for their having invented a new or improved method or methods of applying heat to certain useful purposes.* Enrolled June, 1827.

The specification of this patent has no drawing attached to it, as no specific form or arrangement of parts, is claimed; but the

invention, in its broadest latitude, applies to the heating of every kind of boiler.

The peculiar feature of novelty proposed, is the construction of a descending flue, under a boiler, the bottom of the boiler being bevelled, or formed as an inclined plane. The object of this contrivance is, that the greatest intensity of heat from the furnace, (which will be at the commencement of the flue, at the top of the inclined plane,) shall act against the shallowest part of the water in the boiler, and thereby generate steam with great rapidity, from the surface of the water; whereas, in ordinary boilers, the heat has to pass through the whole mass of the water.

A mode of applying this principle, is proposed in the construction of a tube boiler. The tubes are to be placed horizontally, and ranged side by side, gradually rising, one above the other, upon a suitable inclination. They are to be combined, by means of lateral boxes or tubes, leading from one to the other, at the ends, by which arrangement, the water will be enabled to flow through the whole range.

A force pump is applied, for the purpose of injecting water into the boiler, at the lower tube, from whence it gradually rises through the range, as it acquires heat, and passes off at the top, in the form of steam.

Another proposition is, to form the boiler with ledges, one rising above the other; but the precise method of doing this, we do not exactly understand. It is sufficient to say, that, in whatever way the boiler is constructed, the descending flue is the novel feature of the invention, which, it is considered, will cause the whole of the heat to be taken up by the water; or, at least, the greater part of it, and to generate steam in the boiler, with greater rapidity and economy, than upon any other plan. [*Lond. Journ.*

To James Frazer, *Engineer, for his Invention of an Improved method of constructing Capstans and Windlasses.* Enrolled July, 1827.

This purports to be an improvement upon a patent, dated February 25th, 1826, for a method of constructing capstans and windlasses.

The present improvement consists in forming two rows of capstan bar holes, for the insertion of capstan bars; one row of the holes being in the neck of the capstan, the other in the drum-head. The holes are to be slightly inclined, from the horizontal, the upper row tending downwards, the lower row upwards, so that the outer ends of the capstan bars, inserted in either of the rows of holes, shall range in the same line, for the convenience of being more readily worked by the men.

Within the upper part of the capstan, toothed gear is to be introduced, for the purpose of enabling the capstan to be worked with increased power. The diameters of the wheels and pinions, and the number of teeth in each, may, of course, be varied at pleasure, as set forth in the former specification above alluded to.

This contrivance is to prevent the necessity of pins or clutches, to fix or disengage the gear; for when the capstan is to be worked, by the ordinary power exerted by the men, the bars are to be inserted into the row of holes in the neck of the capstan; but where an additional power is required, then the bars are placed in the holes of the drum-head, and being worked, the barrel of the capstan will be driven round by the toothed gear.

The same contrivance is, also, applicable to a windlass, and may, it is said, be adapted in a very simple way, but the patentee has not shown drawings of the mode. [*Ib.*

To James Frazer, *Engineer, for his Improved method of constructing Boilers for Steam Engines.* Enrolled July, 1827.

It is proposed, as the subject of this patent, to surround the boiler of a steam-engine, with a jacket or outer case, leaving a space of about three inches between that and the boiler, which space is to be occupied with water, up to the level of the water within the boiler.

The intention of this outer vessel of water, is to prevent the bottom of the boiler coming in contact with the wood-work on shipboard, and, consequently, rendering it much more safe for steam vessels, than the usual construction of boilers are.

In order to assist in heating the water in the outer vessel, the flue from the furnace within the boiler, is to be compressed into a tube, and carried down, and passed through between the boiler and its jacket, which tube being encompassed by the water, will, by that means, communicate a great additional heat to the boiler, or, in other words, take up that heat which would, otherwise, pass off without advantage. The generating of steam being, by these means, promoted, and the fuel, consequently, economized. *Ib.*

To James Woodman, *Perfumer, for his having invented Improvements on Shaving and other Brushes, which Improvements are also applicable to other purposes.* Enrolled September, 1827.

This improvement, as it applies to shaving brushes, consists in forming a tube or recess in the handle of the brush, which is to contain soap or shaving paste, and whenever a supply is wanted, a small pin, or sort of piston, is pressed down into the recess, which forces a quantity of the soap or paste through the back of the brush, in among the hairs.

The soap is by that means introduced into the brush, and is brought into use by dipping the hairs into water, and then rubbing them upon the face.

The form of the brush is of no consequence, nor the quality of the hair, whether it be made of bristles, badger's hair, or camel's

hair; the invention being the recess for holding the soap in the handle, and the hole through which it is passed into the hairs by a sliding pin or piston, as described.

The same construction of brush, is applicable to holding oil or any other material, and even to painting brushes; but in that case, the hole through which the oil or paint passes, must be covered by a valve, otherwise the liquid material would flow out too rapidly.

Scrubbing brushes, extract brushes, nail brushes, and a variety of other kinds of brushes, may have soap introduced into the back or case, in which the hairs are fixed, and it may be forced through small holes into the hairs, as occasion may require. [*Ib.*

To Robert More, *Distiller, for improvements in the process of preparing and cooling Worts or Wash from Vegetable Substances, for the production of Spirits. Communicated to him by a Foreigner.* Dated July 18, 1827.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Robert More, do hereby declare the nature of the said invention to consist, first, in preparing worts from grain, or the like vegetable substances, mashed in the state in which it comes from the mill stones, in a vessel without a drainer bottom; and, secondly, in cooling worts or wash, for the purpose of fermentation, by the addition of water at a low temperature. And in further compliance with the said proviso, I, the said Robert More, do hereby describe the manner in which the said invention is to be performed, by the following description thereof, (that is to say,) first, of the said improved process of preparing worts, which is as follows: I place all the grain, or other like vegetable substance that is to be used, in the state that it comes from the mill stones, with all the husky matter with it, in a vessel without a drainer bottom, and mash it in such vessel, whereby I am enabled to use grain yielding a better quality of spirit than in the ordinary mode; the whole mixture, after being cooled down in manner hereinafter described, as the second part of the said invention, is then to be fermented together, and in that state, with the husky matter in it, and when the attenuation is completed, sent to the still in order to the separation of the spirits from the wash.

And secondly, of the said improved process of cooling worts or wash, which is performed by the addition of such a quantity of water, at a low temperature, immediately before the addition of yeast in order to fermentation, as is requisite to reduce the temperature of the whole to that best adapted for fermentation, which is known to practical men, and depends on the density of the worts or wash to be fermented; by this method, there is not only a great saving in the expense of utensils usually employed in cooling distillers' worts or wash at present, but the process is, thereby, accelerated, and may thus be most successfully completed.

Now, whereas I do not claim the use of a vessel without a drainer bottom, generally, but I claim as the said invention, first, the process hereinbefore described, of preparing the worts, namely, from grain or other the like vegetable substances, put into a vessel without a drainer bottom, with all the husky matter, just as it leaves the mill stones, and mashed in that state in such vessel; and, secondly, the process hereinbefore described, of cooling worts or wash, and such the said invention being, to the best of my knowledge and belief, entirely new, and never before used in that part of his said majesty's United Kingdom of Great Britain and Ireland, called England, his dominion of Wales, or town of Berwick-upon-Tweed, nor in any of his said majesty's colonies or plantations abroad, I hereby declare this to be my specification of the same, and that I do verily believe this my said specification doth comply in all respects, fully and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained, wherefore, I hereby claim to maintain exclusive right and privilege to the said invention.

In witness whereof, &c.

Obs.—In Jonas's Distiller's Guide, page 13, it is stated, that the Dutch distillers ferment the *whole* of their malt, mixed with rye meal, into a wash, and pour *husks* and all together, into the still, for the extraction of the spirits: and, as this book was published many years ago, it is evident that the introduction of the first part of the process above-mentioned, into this kingdom, was so many years prior to the date of the present patent: and as to its second part, comprising the method of cooling the wash, since cold water cannot be added to it without diminishing its strength as well as its temperature, either the portion of hot water first poured in must be considerably less than that usually allowed in mashing, as being the best for the extraction of the soluble parts of the grain, or the wash must be more diluted than what experience has determined to be the proper degree for producing the greatest proportion of spirits: unless the distillers, hitherto, have been so much inferior to the patentee in judgment, science, and experiment, as to have now to take lessons from him on those important points, after, we may say, the accumulated experience of centuries, and the expenditure of infinite capital.

The process seems to us well calculated for the advantage of illicit distillers, as it will save them the first cost of numerous vessels, and enable them to carry on their operations in so much smaller compass, as will considerably facilitate concealment: which advantages would, probably, pay well for an inferior produce of spirits, if this should occur, either from the over dilution, or insufficient hot infusion above-mentioned, according as either might predominate.

[*Repertory.*

To Joseph Blades, *Gentleman, for an improvement in the water proof Stiffening for Hats. Communicated to him by a Foreigner residing abroad.* Dated 15th January, 1828.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Joseph Blades, do hereby declare the nature of the said invention, to consist in causing the stiffening of hats to be accomplished by means of gum shell lac, dissolved in alkali, instead of spirits, applied to the hat body, and, afterwards, hardened, or set by diluted acid; and in further compliance with the said proviso, I, the said Joseph Blades, do hereby describe the manner, in which the said invention is to be performed by the following description thereof, (that is to say;) take eighteen pounds of gum shell lac, one pound and a half of salts of tartar, and five gallons and a half of water, or the like proportions of greater or less quantities of the mixture, reserving part of the water to put in when likely to boil over: put these three articles into a kettle over a fire, and boil them gradually until the gum is dissolved, say for about an hour, stirring the whole towards the last. The period of perfect solution, may always be known, by the whole boiling up as clear as water, without any scum on the top; if left till it is cold, there will be a thin crust on the surface, of a whitish cast, mixed with the dirt of the gum, which must be taken off. Dip the hat body into the mixture, in a cold state, so as to absorb as much as possible of it, or apply the mixture by a brush, sponge, or other means, and then draw the hat body off on the plank with a stamper, using a light or heavy hand, according to the stiffness required; the hat body being thus stiffened and drawn out, may stand awhile till dry, or nearly so, then having brushed it over with a hard dry brush, to clean it, immerse it in diluted acid, or water made acid in the following manner: say to five gallons of cold water, put half a pint of vitriolic acid: soak the hat body for about five minutes, when the gum will be set. If they are not to be napped immediately, they may be thrown into a reservoir of pure water, using them as wanted. If the hat bodies have been made in vitriol, soak them in hot water to kill the acid, and dry them before you attempt to stiffen by the above described process, and be careful not to drop water on the stiffened bodies before they have been in the acid water. When stiffening great quantities, be particular to keep your acid water up to the strength laid down as above directed, adding more acid when you find, by applying the tongue, that from repeated immersions, the alkali has somewhat weakened the power of the acid.

The invention which I claim under my hereinbefore in part recited patent is, therefore, the new process of water-proof stiffening for hats, by dissolving the gum shell lac in alkali, instead of spirits, and setting or hardening the said gum, after it has been introduced, as aforesaid, into the body of the hat, by neutralizing it in weak or diluted acid, as above described, and for this purpose, I mention and describe gum shell lac as the gum, salts of tartar as the solvent,

and vitriolic acid to neutralize the same, because I have used these materials, and found them to answer the purpose; but, at the same time, any other alkali that will act as a solvent to the gum that is used, and any other acid that will set such gum, or neutralize the alkali, may be used; and I therefore include their use as part of my aforesaid invention, the object of which is, to produce hats without the use of spirits or essential oils, which have before been used in the manufacture. [*Ib.*

Notice by the Editor.—The foregoing patent, it will be seen by the heading, was taken out as communicated by a foreigner. The invention is American, a patent having been taken out for it by Stephen Hempstead, jr. Charles county, Maryland.

To PETER BURT, *Mathematical Instrument Maker, for an improved Steam Engine.* Dated 4th August, 1827.

THE working cylinder of Mr. Burt's steam engine, is suspended near the top, on two hollow gudgeons; the piston-rod issues from its lower extremity, instead of being in the usual position, and its extremity acts immediately on a crank in the horizontal axle of a fly-wheel, without any connecting bar being interposed, according as it is represented in the drawing, but it may be jointed to the end of a working beam, also, in a similar manner. From this arrangement, the cylinder vibrates backward and forward, on its hollow gudgeons, the perforation in one of which enters into its upper part, while that of the other communicates with a tube that passes down along its side and opens into its lower extremity. The steam, of course, is conveyed through these passages, alternately, to the different ends of the cylinder; and a figure is given, of a method by which this may be effected, by a single D valve, which, also, opens a communication with the condenser, and that end of the cylinder from which the steam is shut off, while it admits it to its other extremity. This valve is situated in the middle of a semi-annular pipe, placed horizontally, the ends of which join the terminations of the hollow gudgeons, at the opposite sides, by a joint shaped in the section of a cone; and iron straps being passed round the ends of this pipe from the gudgeons, screws placed in their centres in the direction of the latter, compress the conical ends of both together, so as to make the joint impervious to steam. The hollow gudgeons work in brass sockets, sustained by upright pillars that form part of the frame-work of the engine. The joints which connect the pipes and gudgeons are made of bell-metal, and all the other parts of the engine are formed of cast-iron, but the piston-rod and valves, which are constructed of the usual materials. No farther directions are given

respecting the valves, than those we have mentioned, except that it is stated, when large engines are employed, a separate valve is to be used for each of the hollow gudgeons.

OBS.—About four years since we saw, at Dock-Head, a vibrating cylinder, used in a steam engine, which had been erected some time; and was, we were informed, the invention of Mr. James Neville; though we have since heard that engines of this sort were erected previously, in the vicinity of Liverpool; but of which, however, we cannot speak from our own knowledge.

The engine at Dock-Head, had its hollow gudgeons placed about the middle of the cylinder; its piston-rod passed out at top, in the common direction, and the hollow gudgeons were contrived, so as to act like cocks, in admitting or shutting off the steam, and in opening or closing the communication with the condenser; which latter ingenious invention, very much simplified the machinery, since the mere vibration of the cylinder, opened and shut the communications, as perfectly as the most complicated valve apparatus.

Now, as in Mr. Burt's engine, this last contrivance is not employed, we can perceive nothing in it that can compensate for the additional parts necessary for the steam-tight joints and other indispensables at the gudgeons, so as to give it any advantage over a common engine, since the mere saving of the connecting bar between the piston-rod and the crank, or the beam-head, evidently, cannot have this effect; and we should think it very unjust towards any patentee, if the mere alteration of the position of an engine, as in this case, would permit another person, by such a simple variation, to evade the patent-right. If such an evasion were allowed, a patent for a pocket chronometer might be defeated by another for placing the very same machine on a table, in a horizontal, instead of a vertical position, which it would assume in the fob; and the patents for numerous other engines, might, also, be rendered nugatory, by similar means; we are, therefore, inclined to think, that the validity of Mr. Burt's patent is affected, by the patent previously obtained by Mr. Neville; since the alteration of the direction of the piston-rod, is the only material difference between the engine described in the specification of the former, and that employed by the latter gentleman. [*Ib.*

To JOSEPH MAUDSLAY, ESQ. *for improvements on Steam Engines.*
Dated 1st August, 1827.

MR. MAUDSLAY'S steam engine, for which this patent was obtained, is of the oscillating sort, the gudgeons of which are placed near the middle of the opposite sides of the cylinder; and one of them being hollow, passages are formed through it, and through the

side of the cylinder, to the two extremities of the latter, into which passages the steam is admitted successively, while the communication with the condenser, is opened to that one of them from which the steam has been turned off. These alternations are effected, by means of a D valve, that operates in a peculiar manner, but which, from the imperfect and inadequate description in the specification, we have been unable to comprehend.

The whole engine is sustained by two triangular frames, placed vertically, a little more than the breadth of the cylinder apart; in bars placed across which, at a proper height, the gudgeons work, while the crank axle, to which the fly-wheel is appended, turns in their upper angles in a horizontal position, and carries, also, an eccentric wheel that works the D valve.

The air-pump in this engine, is represented of an unusually large size, and is moved by a crank of small depth, formed on the last-mentioned axle beyond one of the triangular frames; which causes the stroke of its piston to be much shorter than that of the main cylinder's piston.

The chief differences between this engine and the oscillating engines before constructed, are stated by the patentee to consist, 1st, in the general arrangement of the parts; 2ndly, in the form of the frame by which it is supported; 3dly, in the construction of the D valve and valve-box slide; 4thly, in the eccentric wheel that moves the D valve; and 5thly, in the passages which convey the steam along the side of the main cylinder, to its two extremities; and it is asserted, that the engine possesses the advantage of being less in weight, in proportion to its power, than common engines, of occupying less space, and of costing less in materials and workmanship.

ONS.—We cannot perceive any material superiority of this engine, over other oscillating engines that we have seen, which possessed all the advantages that the patentee has enumerated, as appertaining to his engine, nor, indeed, does there appear much difference between them, except in the disposition of the valves for regulating the communications between the main cylinder, and the boiler and condenser; which, in point of simplicity, at least, was exceeded by an engine of this sort, constructed by Mr. James Neville, which we saw at Dock-Head, about four years ago, and which we have noticed in our observations on Mr. Burt's engine, in the preceding article.

In the specification of this patent, no verbal description of the parts of the engine is attempted; and nothing more is given, than a reference to the drawing annexed to it, which consists only of the mere outlines of plans and sections; in which those of the frame and of the different parts of the engine are so intermixed, as, in some parts, to be unintelligible to any persons, perhaps, but those who were concerned in its construction; and this, unfortunately, happens to be so much the case in the part relative to the D valve, in which the chief distinction between this engine, and others of the same sort, lies, that we own our inability to comprehend it.

We do not mean to censure the use of outline drawings on all

occasions, considering them very sufficient for most subjects of a simple nature; but when complicated figures are to be represented, and sections of tubes, cylinders, and other apparatus, some parts of which are hollow, while others project in various degrees; and where several portions of an engine cross others in numerous directions and at different distances, we think mere outlines quite inadequate to produce fair and distinctly intelligible ideas of the objects; especially when they are unaccompanied by full explanations. [*Ib.*

An Essay on Calico Printing.

[Extracted from Parke's Chemical Essays.]

[CONCLUDED FROM PAGE 295.]

BEGGING to be excused for the irregularity of the preceding digressions, I must not forget to revert to that other kind of discharge-work, which I have engaged to describe, and which I will now attempt, as concisely as is consistent with perspicuity and correctness.

Here, the agent which is employed, is the citric acid, and this is used in various states of concentration, according to the purpose to which it is to be applied, and the strength of the ground intended to be discharged. It is chiefly employed, for the production of white figures upon self-coloured grounds, produced by madder and sundry other dyes. For this intention, the acid, in whatever state of concentration it may be, is mixed with either gum, or with flour-paste,* to a proper consistency for the block, the plate, or the cylinder, and from thence it is transferred to the piece; and wherever it attaches, the mordant, whether iron or alumine, is discharged, and a delicate white arises in its stead.†

The acid here referred to, is produced from the juice of limes or lemons; and, formerly, it was not employed by the calico-printer, until it had been reduced to the utmost point of concentration, and appeared in a crystalline form. Even then, it was not thought sufficiently pure, but was dissolved again, and redissolved and recrystallized, until it became as white and pellucid as any other pure salt in a crystallized state, and was then, generally, sold for 36*s.* the pound, at which high price, it could only be employed on the best styles of work. Now, however, it is oftener used in the brown, or first state of crystallization; and some of the larger printers purchase lime juice, and concentrate it themselves; and in many cases they use it largely, both for discharge and resist-work, without crystallizing it. More on this subject may be seen in the Essay on Citric Acid, which was written with the hope of rendering an essen-

* When citric acid is used for resist-work, it is always mixed with gum senegal and pipe-clay. The clay gives it a greater body, and, likewise, acts mechanically as a resister.

† It should be understood, that the discharge is printed upon the mordants before the goods are dyed. In using citric acid for this purpose, a portion of one of the mineral acids is, sometimes mixed with it.

tial service to a large body of manufacturers, in various parts of these kingdoms.

This mention of discharge-work, by citric acid,* reminds me of another species of discharge, which is employed by the printers of Bandana handkerchiefs, and which I am under the promise of noticing, before I conclude this essay.

The agent which these printers employ, is the nitrous, and sometimes the nitro-muriatic acid. It is used for the purpose of putting yellow figures upon blue silk handkerchiefs. The following is the process which is principally adopted.

Aqua-fortis, or nitro-muriatic acid, of such a strength as is suitable for the kind of blue which is intended to be discharged, is mixed either with gum tragacanth, or with flour-paste, to a proper consistence, and in this form it is printed on the silk, by means of a common block, on which the intended pattern is cut. The consequence of this is, that wherever the acid attaches, there the original colour is discharged, and a yellow dye is produced in its place. The pieces are then steamed, by passing them over a vessel containing boiling water, which gives brilliancy to the colour, and finishes the operation.

If a stronger dye than the usual yellow, or even a deep orange be desired, all that is necessary is, to immerse the goods, for a moment, in lime water, or in a solution of lime and potash; and by varying the proportions of these ingredients, a great variety of shades may be produced.

It must be noticed, that this method is applicable only to the discharge of the colour from *silk* handkerchiefs; the process for producing the spots on *cotton* Bandanas, being entirely different. This manufacture, which is of considerably more importance than the former, was established some years ago, in Scotland, for the purpose of producing imitations of the Bandana handkerchiefs, which are imported from India. It is conducted in the following manner.

Pieces of fine calico, are dyed by the Turkey-red process, of a colour as nearly approaching to scarlet, as can be produced on cotton, by that means; and, upon this plain dyed calico, white spots are produced, by a method to be described hereafter. The pieces of calico, having been bleached to a perfect white, before they are dyed Turkey-red, the present object is, not only to discharge the dye on certain parts of the cloth, but, by the same agent, to restore those parts to their original whiteness.

These discharged parts, are, usually, in the form of spots, sometimes round, and sometimes square or triangular, and these marks or spots are produced, by the action of a chemical liquid, while the pieces of calico are under the action of a powerful press. The machinery for this purpose, is made in an expensive manner, as it is

* Mr. Thomson, a scientific printer, who has an establishment near Clithero, which is carried on under the firm of Thomson and Chippendale, has taken out a patent for discharging the Turkey-red dye by means of the citric and oxy-muriatic acids; and the work executed in this way has a very pleasing effect.

required to be of very great strength, and it is put together with the utmost exactness.

To this press, two horizontal plates are adapted, for the purpose of receiving the calico which is to be placed between them. The pattern intended to be given to the handkerchiefs, is first marked upon these plates; and in the bottom plate, holes are cut of the exact form and size of the intended spots; whereas, in the upper plate, every spot is marked out by a small copper tube, which goes through the plate, and is firmly cemented within it.

When the plates are about to be fixed, there is a contrivance for ascertaining that the orifices of the tubes, in the upper plate, are exactly perpendicular to the respective holes in the under plate; which is a circumstance of the utmost importance, as the discharging liquor, which is poured into the tubes, is designed to pass through the folds of calico, into the corresponding holes in the lower plate.

The apparatus being thus prepared, the handkerchief pieces are neatly folded into squares, of the size of a single handkerchief, and of the thickness of about ten or a dozen folds. One of these pieces, consisting of ten or twelve handkerchiefs, is then laid smoothly upon the lower plate, and is so disposed as to lie square with the plate. By means of a lever, the cover of the press, to which the upper plate is attached, is then lowered, and by continuing the action of the lever, these plates, with the folds of calico between them, are screwed firmly together.

The consequence of this is, that the ends of the tubes fixed in the upper plate, are brought to press upon the surface of the cloth; and as these are made to press upon it with great force, and as each tube has a corresponding hole immediately beneath it, in the under plate, it is evident that the fluid which is poured into these tubes, will be directed into the holes below, and cannot pass in any other direction.

When things are thus arranged, and the press is firmly screwed down, a very dilute solution of chloride of lime, containing a small portion of sulphuric acid, is poured upon the upper plate of the press; and, as this plate has an iron rim round its upper surface, the fluid which is poured upon it, is determined into the tubes, and as it percolates through the cloth, it discharges the colour on those particular parts, and passes off through the holes of the lower plate into a trough, placed underneath to receive it.

It is observable, that the chemical liquid is prepared sufficiently strong, to discharge the colour in the course of about ten or twelve minutes, and yet not so powerful as to endanger the fabric of the cloth; and that the great pressure of the screw prevents the fluid from spreading beyond the precise limits marked out by the tubes and the corresponding holes underneath.

As soon as the discharging liquor is found to have entirely passed through, the press is slackened, and the cloth is removed to make room for another piece, which is immediately substituted; and in this way the process is continued throughout the day, without interruption. One press, requiring the attention of two men only, will

print fifty pieces, containing one dozen handkerchiefs each, in the course of the day.

When the pieces are first taken from the press, the spots which have been produced by the discharging liquid, are not perfectly white; it is, therefore, necessary to have recourse to a subsequent process, similar to the one usually employed for clearing the whites on common printed calicoes; and this not only removes every stain, but, also, heightens the brightness of the Turkey-red dye. I am aware, that at one time, there was a general complaint of such handkerchiefs, after frequent washings, becoming tender in those parts which had been acted upon by the chemical liquor: this, I think, must be owing either to the employment of a liquor too much concentrated, or to the remains of the acid not having been perfectly removed before the goods were dried and pressed for sale; as I am persuaded, that, with due caution, the process may be safely conducted.

When speaking of yellows, it was my intention to have mentioned, that there is a mode of producing yellows on calico, which is not very frequently practised, and yet has a very good effect. The process is as follows:

A strong decoction of quercitron bark, thickened with gum tragacanth, is to be mixed with a portion of very pure muriate of tin, and this, when printed with the usual management, will produce a colour of great brightness and durability. I mention this the rather, because very many pleasing effects may be obtained by this method, which cannot be produced in the usual way, by means of the acetate of alumina, and any of the yellow dyes that may be employed with it.

There is one very important advantage, which this mode possesses, viz. that should it be necessary to pad a piece in diluted acetate of alumina, to obtain a pale lemon ground, the yellow figures, previously imparted by the above process, will not give out any part of their colour to the second mordant; whereas, whenever a strong yellow has been produced in the common way, the pattern is very apt to spread and become irregular, and oftentimes to stain the white ground, when the piece comes a second time into the acetate of alumina.

The most expensive kind of calico-printing, called CHINTZ-WORK, still remains to be described. The term, chintz-work, is descriptive of that kind of calico-printing, which is employed for window-curtains and other furniture, and it differs more in the richness and variety of the colours, than in any other circumstance.

In relating the processes by which these beautiful prints are produced, I shall suppose the calico to be already properly bleached and smoothed, ready to receive the impressions of the block. The first thing then to attend to, is to apply the mordant for the colour which is intended to be imparted in the first instance. Thus, if a black be designed, a mordant of acetate of iron, commonly called iron liquor, is thickened with gum, and printed upon the cloth in any pattern that may have been selected for the purpose. If this same mordant be diluted with water, it will form a proper mordant for a

purple; and the same, still further diluted, will, when it comes into the dying-copper, form a lilac. In this way, all the varieties of shades, from a pale lilac to a strong purple, and from a purple to a black, may be produced by acetate of iron diluted with various portions of water, and then dyed with madder.

In like manner, a colourless solution of acetate of alumina, thickened with gum or flour-paste, forms a mordant for dark red; if diluted with water, it makes a common red; and by diluting it further and further, every shade of pink may be produced. Again, by the admixture of acetate of iron and acetate of alumina, a mordant for chocolate colours, maroons, &c., is formed, either approaching to the purple or the red, according to the admixture; that is, according to the proportion of either of these original mordants, which may predominate in the mixture.

When these several mordants have been printed upon the calico, they are allowed to dry for two days or more in a stove, or drying-house; they then go through the operation of dunging, which consists in rinsing them in warm water, in which a little cow-dung is diffused, as has been already described. When the pieces are sufficiently dunged, which is not the case till all the superabundant mordants are removed, they are well washed in clean water, and then boiled in a decoction of madder, until the madder-bath is exhausted. In consequence of different mordants having been applied to the cloth, this one boiling in the madder-liquor will at once produce all the colours above-mentioned. When the pieces are thus dyed, they are to be rinsed in cold water, and laid upon the grass to bleach. By this exposure to the air, for a few days, the whole of the ground to which none of the mordants had been applied, will become perfectly white.

The processes which have now been detailed, will produce what is called *common* chintz-work; but if it be desired to make the goods still richer, by the addition of yellows, bright olives, drabs, &c., the cloth must undergo another series of operations, which may be thus described:

Upon those parts of the calico which still remain white, any of the above mordants may be printed, according to the effect designed to be produced; after which, all the preceding managements are to be repeated, except that instead of boiling in a decoction of madder, they are to be immersed for about half an hour, more or less, in a warm decoction of quercitron bark, (the *Quercus nigra* of Linnæus,) a most important dye-wood, introduced by Dr. Bancroft, and which is found to give out a much brighter colour to *tepid* water, than it does when treated with *boiling* water, or with water nearly approaching to that temperature.

The effect produced upon these prints, by an immersion in a lukewarm decoction of this American bark, will be quite different from that produced by the madder; upon those parts of the cloth where the mordants have been printed, which before produced a black, a dark olive will only be apparent; and instead of pompadours, will be drabs, and instead of reds, we shall have yellows, which will

vary in intensity, according to the strength of the aluminous mordant.

Again: a further variety may be given to these prints, if the yellow mordant, or acetate of alumina, be applied to any of the colours which have already been dyed with madder; but this must be done before the pieces are immersed in the decoction of bark. This application will convert the reds and pinks into different shades of oranges, and the lilacs into cinnamon colours. By means of these different processes, an endless variety may be given to the goods, and a calico-printer of taste, will never be at a loss how to produce a pleasing effect, whatever may be the patterns which he has to imprint upon the cloth. The second immersion in the dying-vessel will, however, give a yellow tinge to the remainder of the whites, but a short exposure on the grass will obliterate it.

When chintz-furniture-prints are designed to have as much variety of colouring as possible, a part of the remaining white is often coloured blue or green, or of any shade between those colours, by a still different process. This is done with what is called pencil-blue, which is a preparation that has already been described. The blue is given, by putting in the prepared indigo with a pencil; and the green is produced by pencilling some of the same colour, over certain parts of the pattern, which has already been dyed yellow.

When these colours have been imparted, the printing is said to be finished, and the pieces are hung up to dry, for at least twenty-four hours; after which, they are rinsed thoroughly in cold water; and when they have been dried with care, they are properly calendered and put up for sale.

Nothing now remains, but to notice an improvement, which has been made of late years, by the introduction of CYLINDER-PRINTING, which has the advantage of superior accuracy and neatness, as well as of great expedition.*

The machines which effect this, are rather complicated, and very expensive; but some kind of work cannot be produced at so cheap a rate, by any other means. They are so contrived, that the cylinders on which the patterns are engraved, furnish themselves with the prepared colour during their revolutions; their surfaces are kept clean by a steel knife, or *doctor*, as it is called, passing over them the moment they have charged themselves with the thickened colour; and they have such a pressure given to them, either by means of screws or levers, which can be tightened or slackened at pleasure, that the whole cylinder is made to deposit its colouring matter with the greatest certainty and exactness on the cloth, while this rolls over it in succession, from one end of the piece to the other.

These cylinders, which are made of copper, are from eighteen to forty-two inches in length, according to the width of the calico to be printed, and from three and a half to five inches in diameter;

* A variety of observations on the printing of calicoes by means of the cylinder, which may be read with advantage, in connexion with this essay, will be found in Nicholson's 4to Journal, vol. i. page 18.

and these massy rollers have the patterns enchased upon their surfaces, in the same way as a pattern is cut upon a flat plate of copper, that is intended to be employed in copper-plate printing.*

Many of these machines are contrived, so as to carry two of these cylinders, each of which has a trough of colour attached to it, by which means two different colours may be printed on the same calico, at one and the same time; and Mr. Adam Parkinson, of Manchester, has invented a machine capable of printing, at one time, by means of one cylinder, and two surface rollers, or by two of the former and one of the latter, three distinct colours.

These machines have not only the excellence of printing more correctly than can possibly be done by means of the block, but the saving of time and labour which they afford, is great indeed. A piece of calico, which would take a man and a boy three hours to print with one colour, or six hours to finish with two colours, may, by this means, be printed in three minutes, or three minutes and a half, and the work will be much more completely done than could even have been imagined, before the introduction of this invention.

Besides these cylinders, there are others, which are called SURFACE-MACHINES, which contain cylinders, not of copper, but of wood, and which have the pattern formed upon their surfaces in relief, exactly similar to the blocks described in page 174. These are employed in particular styles, especially on light grounds,† and for certain kinds of resist and discharge-work.

It must be obvious to every one who is acquainted with the subject, what an astonishing facility these machines must have afforded to the production of printed calicoes; and, also, what an advantage they give to the British printer, in foreign markets.

Information and Prospectus respecting the Fecula of the Sweet Potato. Being a continuation of the article on that subject, in the 5th volume of the Franklin Journal; communicated by G. G. BARRELL, ESQ. *Consul of the United States, at Malaga.*

Boston, October 2, 1828.

MY DEAR SIR,—I have recently received a canister of the fecula of the sweet potato, from G. G. Barrell, Esq. consul of the United States, at Malaga, with an account of its use, other than as starch,

* As these cylinders are made with plates of copper hammered into a circular form, and joined by brazing, great loss has, sometimes, been sustained by the engraving giving way upon the brazed joint. To obviate this, a patent has been obtained, for boring the copper cylinder from the solid metal, in the modern way of boring cannon.

† In light work, the white grounds are apt to be soiled by the cylinders: hence, surface-machines were contrived, and these are not liable to the same objection. Cylinder-machines are more commonly employed, in those styles which are full of colour, and leave but little white.

with a request, that experiments may be made of it, by some of the medical faculty; and as a sample was sent to the Massachusetts Hospital, for the same purpose, I have concluded to forward that sent to me, to the directors of the Pennsylvania Hospital, with a request that they will be so kind, as to publish their opinion of its use in the Medical Journal of the city, or the Franklin Journal. As the account of the mode of extracting the fecula, which I received from Mr. Barrell, appeared in the Franklin Journal, I should like to have the prospectus I enclose, inserted in that useful work, whether it is printed with the result of the experiments, at the Hospital, in the Medical Journal or not.

As Mr. Barrell has evinced a commendable zeal to be useful to his country, it is but just that his good deeds should be known.

If doctors Physick and Chapman are not connected with the hospital, I desire that some of the fecula may be given to them, with the hope that they will try it, and give their opinion of its utility, for the purposes named in the prospectus, which please to have copied and presented to them.

With sincere respect and great esteem,
your most obedient servant.

GERARD RALSTON, ESQ. (*Signed*) H. A. S. DEARBORN.

Prospectus of the Fecula of the Sweet Potato.

This most useful discovery, has taken place in Malaga, the only part of this hemisphere where that admirable production of the earth, characterized by Linnæus, *Convolvulus Batata*, class 5, order 3, of the Convolvulus family, is to be found; and has been rewarded by his Catholic majesty with a patent of invention. This fecula, extracted without fermentation or putrefaction, and for that reason wholly free from acidity, has been, scrupulously, analyzed by some of the most able professors in pharmacy, commissioned for that purpose; who have unanimously pronounced it superior to Sago, Tapioca, or any farinaceous substance, hitherto discovered, without excepting the celebrated plant, known by the name of *Galanga Arundinacea*, or arrow root, from the extreme whiteness, suavity, and fineness of the molecula which compose it, (visible only by the help of the microscope) from its most digestible and nutrimental qualities, and, finally, from being combined with the saccharine matter, of which every other species of fecula is totally void.

Thirty-five of the principal physicians and surgeons of Malaga, including the director and professors of the Royal College, and the physician-general of the army, Dr. Andrew Vila, have attested, authentically, its sovereign efficacy in nervous debilities; in the febrile tabes, or consumption, and in the convalescent state; and as a medicine in diarrhœa, dysenteries, and all disorders proceeding from irritation in the stomach and intestinal canal. It has since been seen, with admiration, to cure, in a few days, the most inveterate gonorrhœas; the Fluor Albus, or whites, and excess in the menses; and has been found of admirable use as nourishment for children

during lactation, substituted for the food called pap, which frequently is attended with such bad effects.

The use of this excellent article, is not to be limited solely to the sick; the delicacy of its substance, (attested by the most celebrated cooks and confectioners in Spain,) rendering it of incomparable utility in pastry, fritters, &c., and in custards, blanc-mange, and biscuits, particularly those termed in Spanish, *Borrachuelos*, which, composed of fecula, are absolutely inimitable by the finest flour of wheat.

The most common method of using it as a medicine, or as food, is as follows.

For milk porridge, "*natilla*," take a quarter of a pound of fecula, and dissolve it in a sufficient quantity of cold milk, (that of almonds is preferable, in case of sickness) the lumps must be well mashed; and with the addition of two quarts of milk, put before a slow fire, stirred in one direction till sufficiently boiled, introducing sugar and cinnamon afterwards, as the disease may permit; as a cooling medicine, it is generally used in its crude state, either as a clyster, or as orgeat, with water and sugar, particularly in cases of gonorrhœa, and all kinds of fluxes.

In using the fecula for pastry, fritters, &c. &c. it is necessary to observe, that in consequence of the fineness of its molecula, on coming in contact with liquids, it thickens and increases very considerably; the proportion in which it is to be used, relative to flour, is that of ten and a half ounces, where a pound of the latter would be required. Finally, mixed with one-third part of flour, or in equal quantities, it produces bread, unequalled in point of wholesomeness and delicacy.

Certificates.

I, Don Rafael Briz, doctor in pharmacy, hereby certify, that having been commissioned by his excellency, the governor of this city, to analyze the fecula of the sweet potato, invented and extracted by Don R. Mackinnon, after a most scrupulous examination and repeated trials of this delicate substance, I have found it to be beyond comparison superior to Sago or Tapioca, and worthy of every degree of encomium, for having demonstrated itself, in the most evident manner, from its rare and admirable properties, both physical and chemical, to be the most salutary, select, and pure, of all feculas or farinaceous substances, hitherto discovered, which analytical task I delivered to the said authority, in my exposition of the subject.

Malaga, 4th November, 1827. (*Signed*) Don Rafael Briz.

We the undersigned, doctors in medicine and surgery, certify, that having seen the analysis and report of Don Rafael Briz, on the fecula of the sweet potato of Malaga, and carefully observed its admirable effects on a great number of convalescents, to whom we have applied it, sometimes as a cooling medicine, as an alimentary substance, and sometimes as a cathartic, we agree perfectly with his opinion with respect to it, and conceive that, besides its excel-

lent effects, in general, it would be singularly useful in bilious diseases, and cases of dysentery.

Malaga ut Supra.

(*Signed*) Joseph Mary Salamaca, Joseph Prieto Lopez, Rafael Plaza, Joseph Martinez, Joseph Cortez, Antonio Argobejo, Manuel Mary Huzarmas, Gabriel Mendoza, Francis Laleta, Joseph Casablanca, Antonio de Navas, Vincent Orts, Joachin Giraldes, John Buraz, Antonio Ducares and Gomez, Michael Fernandez-Navarro, John Gonzales Calo, Joseph Brull, Joseph Mendoza, Julian Gomez, Christopher Alarcon Parras, Francis de Rula Fernandez, Antonio Rodriguez, John Nepomuceno Fernandez, John Mendoza, Andrew de Castrilla, Francis Falleda, Santiago Lopez, Antonio Ferran, Francis de Estrada, Antonio Cerez, Joseph Felix Guerrero.

I, Don Andrew Vila, Physician-general of the Royal Armies, and of the military hospital of this city, inspector of epidemical complaints in New Castile, Fellow of the Royal College of practical medicine in the court, and one of his majesty's pensioners of merit, certify,

That the healthy state of the lower class, and children who use the boiled sweet potato, as their principal nourishment, the suavity and tastefulness of the fecula, and the inalteration of its properties, by extraction, together with its total separation from the fibrous parts, which alone resist the digestive powers, stimulated me to undertake a course of trials, which I conceived might be useful to the health of the military men under my command, as well as the economy of the royal finances. The dysenteries, degenerated into a putrid and incurable character, which attack the garrisons on the coast of Africa, and whom the benignity of his majesty sends to Spain for their cure, were the first objects of my essays; the use of the fecula speedily calms the symptoms of that terrible disorder, and arrests the progress of the tabes, distinguishing itself, particularly, for its admirable effects, in diarrhœas, which it perfectly cured in a few days. If facts can warrant the fortunate results of sound practice, my observations in the military hospital under my care, convince me even to demonstration, that the fecula of the sweet potato, is of a distinguished use in nervous weakness, in febrile emaciation, and in the convalescent states; and as a medicine in diarrhœa, dysenteries, and every disorder proceeding from irritation in the stomach and intestinal canals. I sign this declaration in Malaga, this 8th day of November, 1827.

(*Signed*) Andrew Vila.

Remarks on Talbot's Propelling Machinery, and on the Chevalier de Baader's claim to improvements on Rail-Roads and Carriages.

TO THE EDITOR OF THE FRANKLIN JOURNAL.

Sir,—In examining the principles of the "propelling engine," invented by Mr. Talbot, which is described in the Franklin Journal

for November, my mind was forcibly struck with the consideration, that a person of intelligence and science, as he is represented to be, should be so egregiously deceived as to the practical operation of his apparatus. His invention seems to be nearly allied to Genet's flying machine, and like him, he evidently belongs to that class of theorizing philosophers, who have clear perceptions enough of the operation of a single philosophical or mechanical principle, when viewed separately, but not of a combination of such principles; and, therefore, are unable to calculate the effects of a complicated machine.

The mode by which Mr. Talbot proposes to propel vessels and carriages, and in the success of which he has furnished evidence that he is sufficiently sanguine, is, as he expresses it, by "*the application of the pressure of the atmosphere as a resisting medium.*" He supposes that when a vacuum is produced in his atmospheric cylinders, as he calls them, by forcing the pistons towards the open end, the pressure of the atmosphere upon the pistons tending to force them back, will drive the boat in that direction. Now if the pistons alone were confined to the boat, and the cylinders were fastened to something of sufficient stability without the boat, and disconnected from it, the pressure of the atmosphere upon the pistons would, unquestionably, tend to propel the boat in the direction of the cylinders. But the whole of Mr. Talbot's apparatus, is placed within, and confined to the boat; so that, so far as the boat is concerned, the power exerted by the atmosphere, as well as by the steam, is entirely ineffective, and the boat, in consequence of the power thus applied, will have no tendency to move one way more than another; for when a vacuum is produced in the atmospheric cylinders, it is clear that the weight of the atmosphere will press the cylinders in one direction, with exactly the same force that it does the pistons in the opposite direction. The same is equally true in regard to the action of the steam upon the steam cylinder and piston: and it would be as feasible to propel a boat merely by working a steam-engine in it horizontally, without the atmospheric cylinders, as with them.

Mr. Talbot has, evidently, deceived himself, by his arithmetical calculations, and by referring the propelling force of his engine, sometimes to the end of the beam E, and sometimes to the fulcrum or middle. He supposes that his two atmospheric cylinders, and the steam cylinder, are pressed towards the stern of the boat, with an aggregate force of 65,974 pounds, this force being applied to the ends of the beam; but in his estimate of the force tending to press the boat in the opposite direction, he supposes it to act upon the fulcrum or middle of the beam, and, therefore, he doubles the power exerted at one end of the beam, and this without taking into the account the force applied to the other end of the beam. Now, it is manifest that, by referring the power to the fulcrum, or middle of the beam, he loses as much in velocity as he gains in intensity, and in this way the opposing forces will be balanced. But, admitting his reasoning, in relation to the first stroke of his engine, to be correct, I would ask him why the beam, at the fulcrum or centre,

will not press with the same force towards the stern of the boat, at the returning stroke of his engine, as it did towards the bow at the first stroke?

In my apprehension, it would be quite as ridiculous to attempt to propel a boat by Mr. Talbot's contrivance, as it would be for the passengers within the boat to attempt to move it in any direction by crowding with their shoulders against one part of it, while their feet rest upon another part; or as it would be for a person to attempt to lift himself in a basket.

If, however, there be a principle in the pressure of the atmosphere which has been discovered by Mr. Talbot, and which will produce the effect supposed by him, he will be able, by its application, not only to propel carriages and vessels horizontally on land or water, but also to force them upwards, and to travel through the air. The discovery of this principle, if it really exist, must be reckoned as one of the most brilliant that has enriched the science of natural philosophy; and, although I have no faith in its existence, I shall be quite delighted if the experiments which Mr. Talbot is about making, shall not disappoint his expectations.

Among the other new inventions mentioned in the last number of the Franklin Journal, upon which the authors appear to have built extravagant expectations, I have also been led to notice that of the Chevalier de Baader, for constructing iron rail-ways and carriages. As the details of his plan are not given, it is impossible to prove that he cannot perform all that he promises. It will, however, require considerable faith to believe, without some other evidence than the Chevalier's assertion, that "he has discovered a new principle, by which the power and motion of stationary steam-engines, established at considerable distances or intervals, and working without interruption, can be imparted to any number of loaded carriages passing upon a rail-way from one engine to the other, *without ropes, or chains, or any other immediate apparatus*, and with any reasonable velocity." This supposed newly discovered principle, whenever it shall be made known, I suspect will be found to bear a strong resemblance to that discovered by Mr. Talbot, and be capable of producing the same effects. But if there be in reality no new principle, by which those wonderful effects are to be produced, I can conjecture no mode, by which the power of a stationary engine can be transferred to a carriage, unless it be by a coiled spring, to be wound up by the working of the engine, and then to be attached to the carriage upon which it shall exert its force thus imparted to it.

It is not my purpose, by these remarks, to deride or repress that spirit of improvement and propensity for inventions, in the mechanic arts, for which the present age is so distinguished; for although many schemes are suggested, and attempted to be put into operation, which have nothing to recommend them but their absurdity, yet the inquiries induced by them may lead, and sometimes do lead, to valuable improvements. B.

Massachusetts, Nov. 10, 1828.

Remarks by the Editor.—Whilst we feel it due to the public to indicate our opinions on the subject of some of the patents granted in the United States, it will be readily perceived that there are considerations which, of necessity, force us to do so with great caution. This, however, is not the case with correspondents; our pages are, and shall ever be, open to the utmost freedom of remark, whenever the advancement of truth appears to be the aim of the writer; and those who think themselves aggrieved, may always be heard through the same medium.

We have read the foregoing article with peculiar satisfaction, as it is, in every particular, in perfect harmony with the views which we have entertained, and expressed. We had repeatedly observed, that if this principle of propelling vessels, &c. were correct, all that would be necessary to carry them up into the air, would be, to turn the atmospheric cylinders, with their mouths downwards, as fluids press equally in all directions. Should the agitation of this subject induce the patentee to pause, to re-examine the ground upon which he stands, and to retrace his steps before he finds himself on the quicksands, the advantage to himself will not be more real, than the gratification which we shall experience, in having aided in producing this result.

AMERICAN PATENTS.

LIST OF AMERICAN PATENTS GRANTED IN OCTOBER, 1828.

With Remarks and Exemplifications by the Editor.

1. For *an Engraving or Etching Machine,* being a new combination of machinery, comprising the principles of the circular and straight line dividing engines, and an engine causing a revolving graver or etching point, to engrave, or trace circular lines, upon either a printing cylinder for printing calicoes and other goods; or upon a mill or cylinder used for transferring patterns upon a printing cylinder for printing calicoes or other goods; or upon a mill, to be transferred to bank note dies; Rufus Tyler, Philadelphia, October 9, 1828.

The patentee states, that he is engaged in making further improvements, so as to render his machine more perfect; for these, when completed, he intends to apply for a patent, and, therefore, requests that a delay of two or three months may take place before publishing an account of his invention, in order that the whole may be presented to the public, in the most perfect form.

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2. A machine for *Washing Clothes and Churning Butter;* John Grout, Caroline, Tompkins county, New York, October 10, 1828.

There is a strong similarity between this machine and several of its predecessors; we, therefore, pass it over without attempting a further description, than merely to say that there is a box, or trough,

fixed upon rockers, with a beater and strips within the box, and that a rocking motion is to be given to the whole, when the machine is used.

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3. An improvement in the *Machine for Picking Cotton;* James Pinell, and Aber Maxson, Barboursville, Cabell county, Virginia, October 10.

The object proposed is, to turn the ordinary machine for picking cotton, by means of the foot applied on a treadle, exactly in the manner of the common turning lathe, and thus to substitute the power of men, for that of horses.

The brushes used to remove the cotton from the saws, are not attached immediately to the shaft, there being "two or more steel springs, fastened at one end to the stock of the brush, and at the other to the revolving shaft; the effect of which is, to admit of a vibration, which frees the brushes from the cotton, without the trouble of cleaning them."

What is claimed, "is the application of the crank, the treadle, and the fly wheel, so as to turn the same by means of the foot; and the use of the spring at the backs of the brushes."

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4. An improvement in the *art of Melting and Fusing Glass;* and the materials for making and forming glass; Thomas W. Dyott, M. D. Philadelphia, October 10.

(See specification.)

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5. An improvement upon the ordinary *Machine for Carding Wool;* Don Marcus Bacon, October 10.

(See specification.)

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6. For the use of *Pine Resin* as an article of fuel *for the purpose of heating ovens* for the baking of bread, bread stuffs, meats, and such other articles of food as may be best cooked by baking; also for the purpose of heating hatters' kettles, used in the manufacturing and colouring hats; Richard L. Wood, Philadelphia, October 10.

The following is the specification.

"The manner of using the resin, is to break it in small pieces, and ignite a sufficient quantity at the entrance of the flues, so constructed as to pass around, and over the top of the ovens used for baking, and under and around the kettles used by hatters; adding a sufficient quantity, from time to time, to produce the required heat."

Remarks.—The foregoing, it is presumed, was suggested by the employment of rosin in Dr. Dyott's glass house, which fact was known in Philadelphia. Although the patents were issued on the same day, the application for that for fusing glass was antecedent to that of Mr. Wood. The purposes for which rosin is proposed to be used by each, differ specifically, and were not, therefore, considered as interfering applications. If the respective patentees can

sustain their claim to the use of rosin, it must, of course, be limited to the precise uses named by them.

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7. A machine for *Thrashing Grain*, denominated the "American Thrasher;" John W. Post, of Philadelphia, and John Ryan, of New Baltimore, Virginia, October 10.

In this machine, there are to be two feeding rollers, into which spikes, or teeth, formed of wire, are to be driven: the gudgeons of the upper roller work in a groove, to admit of its rising and falling with the varying thickness of the straw in feeding. The beating cylinder has two or more strips of wood, running its whole length, and armed with strips of iron on the edges which beat out the grain; there are teeth, in one or more rows, set along these strips, and behind the beating edges, for the purpose of combing in, between the straws, and of thus obviating the difficulties which arise from the beaters consisting of a straight edge only. The patentees propose sometimes to omit the feeding rollers, and to substitute an arrangement of slightly projecting spikes in a straight feeding-board. Some other modifications are mentioned, as may be seen by the claim, which is, "the addition of spikes upon the beating strip attached to the cylinder, with the spikes standing back, and projecting beyond the strips; the application of two of the above beating cylinders, and the omission of the curb; the omission of the feeding rollers, and the curb, by the application of one of the beating cylinders, and an arrangement of spikes immediately under the cylinder, in a straight feeding-board."

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8. A machine for *Mortising and Tenoning Timber;* William Jackson and J. J. Speed, jr. Speedsville, Tompkins county, New York, October 10.

The general construction of this machine is that of a common saw mill in miniature; there being a frame with a carriage on it, upon which the piece to be mortised, or tenoned, is to be secured. There is an ingenious, but simple contrivance, for shifting the pieces laterally, so as to adjust them, by bringing the gauge marks to the saw, or chisel. A saw is strained in the frame, when tenons are to be cut; and this, for mortising, is to be replaced by a chisel. There is a slip rail attached to the saw frame, for straining the saw, or for adjusting the chisel so as to enter the proper depth. A feeding arm causes the carriage to advance, by working on a straight rack. The ordinary mode of working the frame, is by a lever, in the manner of the common pump handle. "The chisels to be used, may be the common mortising chisel, the grooved chisel, or the common mortising chisel, with a steel spring on the back, having a beard on the lower end of the spring next to the chisel, to lift out the core or chips." "What we claim as our invention, is the particular construction, as described by us, of the set or gauge for confining and regulating the timber. Also the slip rail in the gate, regulating the depth of the chisel, and straining the saw, together with the

spring chisel before mentioned." "We also claim as a new application of parts heretofore known and used, the saw gate, balance, and lever, as before described."

9. An improvement in the *Pump for drawing Beer and Cider, Soda Water, &c.;* Levi Pitkin, Rochester, Monroe county, New York, October 11.

The object proposed, is to get rid of the poisonous matter contained in the metallic tubes and chambers of the pumps generally used. The following is the whole of the specification.

"The object of this improvement, is to do away the corroding, or poisonous effects of using metallic substances, or materials, in the construction of such pumps. The construction of the improved pump, is the same as those now in use, the only thing claimed as new, being the materials of which this improved beer pump will be constructed; which are either lignum vitæ, ebony, or other suitable wood; marble, free, or other stone; stone, or earthenware."

10. A triangular measure *Ruler for delineating Garments;* Allen Ward, Philadelphia, October 11.

(See specification.)

11. Improvement in the machine for *Sawing Clapboards* with a circular saw, for which a patent was obtained by Robert Eastman and Josiah Jaquith, March 16th, 1820; Jonathan Kidder, Gorham, Cumberland county, Maine, October 11.

In order to describe these improvements, we must present engravings, not only of them, but of the original machine. This we shall not now do, but merely give the claim of the present patentee, reserving a particular description for a future occasion. "I claim as improvements upon Eastman & Jaquith's original machine, the two bevel wheels, the rag-wheel, the lever, the hands, the moveable pin aforesaid, and nothing more."

12. A mode of *Covering Buildings;* Hazard Knowles, Colchester, New London county, Connecticut, October 11.

The process is, to nail cloth (hemp cloth being preferred) upon a smoothly boarded roof. To cover this cloth with wheat or rye paste to fill the pores, and make it smooth, and then to cover the whole with ordinary oil paint.

For information on this subject, our readers are referred to p. 172, vol. 1, and p. 345, vol. 4, of this Journal.

13. A mode of *Constructing Doors*, to secure buildings against cold and storms; Daniel Williams, jr. New London county, Connecticut, October 11.

A groove is made along the under edge of the door, and within this a metal plate, or strip, reaching the whole width of the door, is hung upon pivots at the ends, so as to close upon the sill, when the

door is shut. The particular arrangement cannot well be explained in words, and the drawing furnished is not very descriptive.

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14. An improved machine for *Cutting Rags* for the manufacture of paper; Moses Y. Beach, Springfield, Mass. Oct. 11.

This machine bears a strong resemblance to some of those used for cutting straw. There is a heavy fly-wheel turning on a stout iron shaft, the gudgeons of which rest on a strong frame; two or more arms project at right angles from the shaft of the wheel, and carry knives, or cutters; on the edge of the frame, a cutter is firmly fixed, so that the others, in their revolution, pass it, and cut, like the blades of shears. There is a feeding cloth passing round rollers, like that in the carding machine: upon this cloth the rags are placed, and carried by proper gearing, between the cutters. By altering the gearing, the rags may be cut more or less fine, as they may be wanted.

"The inventor claims as new, the use and application of this machine for cutting rags for the manufacture of paper, by means of improvements adapting it to that use; consisting in extending the horizontal shaft through the axis, so that each end of it rests in the strong frame, thereby giving stability and uniformity to the motion of the knives; also in the increased power derived from increasing the weight and dimensions of the wheel and arms, beyond what has heretofore been used or known for any similar operations. Also in the use of the arms, one or more proceeding from the horizontal shaft, and attached to the balance wheel, or placed at a distance from it, as may be preferred; also in the use of the regulating screws which hold said knives in their places, and graduate them as required; also in all the other particulars above specified, so far as they differ from all other machines heretofore known or used."

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15. Improvement in *Window Blinds;* John Parkerson, Boston, Massachusetts, October 11.

The plan proposed, is to have two metal pins projecting from each end of the slats of which the blind is composed; these pins are to pass into holes made in moveable strips, confined within the edges of the frame of the blind. These strips are confined in their places, and made to traverse up and down, by means of flat disks or wheels, of metal, which turn on centre pins, between the sliding strips and frame, having each two pins in their peripheries, which pass into holes in the sliding strips, in the manner of the pins on the ends of the slats.

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16. *Fastenings for Bedsteads* and other framings, by a mortise and tenon, called the "Mortise and Wedge dove-tail tenon Fastening;" William Swift and William Ottivelle, New Bedford, Massachusetts, October 11.

The exact construction of these cannot be shown without drawings: the general principle of their action, is similar to that of some

fastenings previously known. Plates are let in and screwed on to the posts, and are flush with their surfaces: in these plates are mortise holes and slots, to admit iron pins, which are let into the ends of the rails; there being two in each end, near their upper and lower sides. The back parts of the plates are dove-tailed, or wedge shaped, and upon these wedge shaped parts, notches upon the ends of the pins, bear, and are tightened by being forced down. They are well represented in the drawings which accompany the specification; but as they will, probably, be found at an early day in most of our hardware stores, an engraving of them is unnecessary.

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17. For *Preparing the Back-lint, or Fibres of Hemp;* Abraham K. Smedes, October 11.

(See specification.)

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18. A *Rotary Steam Engine,* for propelling vessels, or machinery, or for any purpose to which steam power is applied; Stillman Blake, Providence, Rhode Island, October 11.

(See specification.)

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19. *Spinning and Roping Cotton and Wool,* by a machine called the "Complete Spinner;" John W. Wheeler, Galway, Saratoga county, New York, October 11.

This is one of the machines commonly called "Domestic Spinners;" and is intended to run from eight to about twenty-four spindles. These are all, of course, modifications of the larger machines used in cotton and wool factories. In this instrument, the rims of the band wheels are directed to be made of strips of raw hide, formed, whilst wet, upon wooden moulds, and allowed there to dry and become hard. The collars, or poppet heads, as they are called, of the spindles, are directed to be made in a peculiar way, of leather, and of horn. A particular mode of tightening the bands is designated, and there are some other variations in the arrangement of the parts. The claims of the patentee, are as follow:

"1st. The raw-hide rims of the wheels.

2nd. The manner of placing and applying the friction pulleys, so as to produce equality of bands, and diminish friction.

3d. The particular mode of communicating motion to the spindles, by arranging, gearing, and banding the wheels, friction pulleys, and spindles.

4th. The peculiar mode of hanging the spindles."

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20. Improvement in the *Revolving Rail, and Round Tenon Bedstead;* Garret Post, Auburn, Cayuga county, N. Y. Oct. 11.

Round side and end rails, with ratchet wheels, and clicks, or falls, for tightening sacking bottoms, have been patented both in this country and in England. The present patent varies the use of round rails and tenons, by letting plates of metal into the posts, so as to be flush; these plates to have holes in their centres, to receive the tenons, and a circle of smaller holes at a sufficient distance from

them, to receive the points of bolts, fixed longitudinally in the rails, to retain them in their places, when the sacking is strained. It is also proposed, sometimes to use the ratchet wheel, cast so as to form a cap to the rail, having the tenon cast on to it, and affixed to the rail by screws. The rails to be tightened by a lever fitting into a hole in the rail, or by taking a hitch with a cord upon one of the pins to which the sacking bottom is fastened. The sacking is either to have holes worked in it, as usual, to hitch upon pins on the rails, or a cord is sewed within the edge of the canvass, and loops left to pass over the pins. To prevent the rails from springing, braces are formed by pieces of plank, placed edgewise, and passing from side to side, their ends being hollowed so as to fit the rails, which, consequently, retain these stretchers in their places.

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21. An improvement in the machine for *Carding, Winding, and Making of Hats*, or felts; Isaac Sanford, Blockley, Philadelphia county, Pennsylvania, Oct. 11.

There is a curious history attached to this machine, the particulars of which we cannot give, but will merely state the fact, that it has lain dormant for about twenty-nine years, the money having been paid into the treasury, on the 22nd of February, 1799; and a model having been deposited in the office on the 21st of December, in the same year. Since that period, the inventor has been engaged in other pursuits, but has, within a few years, again turned his attention to the subject of this machine, and has taken out his patent.

We cannot furnish, without engravings, a description which would give any adequate idea of the construction of this ingenious instrument, and we shall, therefore, not attempt it. A number of machines, for the same purpose, and having many parts in common, have been patented, and suits respecting their validity are now pending. The present claim appears as a veteran in the field, so far as age is concerned, but in the contest, is a new recruit; should it prove a soldier of fortune, its merits shall, hereafter, be made known.

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22. A *Machine for Cutting Files*, called "Hatch's Improved File Cutter;" John Hatch, Roxbury, Norfolk county, Mass. October 11.

This machine is intended for cutting files entirely by pressure, without a blow from a hammer. The whole instrument with its adjustments are necessarily complex; and as the object of cutting files by pressure is novel, the patentee has not thought it necessary to claim any particular part, but has given a description of the whole.

The file to be cut, is sustained upon a firm bed or anvil, the chisel, placed at the proper slope, is worked by a toggle joint, and the motion is regulated by a heavy fly-wheel. The file to be cut is carried forward by a screw, moved by a ratchet wheel, the feed of which may be regulated. As files are taper, the bed upon which the file is cut, is raised or lowered by a sliding piece, which passes under it, and which advances with the file. The form of this piece

must correspond with that of the file, being in shape exactly its reverse; that is, as files are thickest in the middle, this must be thinnest there, and diminish, or increase, exactly in this reversed proportion.

These are the essential features of the machine, but with respect to its operation, we have our doubts. File cutting machines have been repeatedly made, but we do not know that any of them have been found to answer so well as the hand of a clever workman; and we know, that most, if not all of them have been abandoned. Two difficulties appear to us to present themselves in the action of a machine to operate by pressure; the first is, the necessity, and extreme difficulty, of making the blanks to be cut, perfectly true, and all alike in their relative thicknesses; and without this, the guide cannot raise the bed so as to cause the cutter to bear every where with equal force. The plan proposed will not obviate this, nor do we know of any by which it can be overcome. The second difficulty which we apprehend, is in the effect produced by pressure, when compared with percussion. We must doubt whether the same kind of edge will result from successive cuts by pressure, and by blows; this is a point which experience alone can decide, and we should like to know the result.

We could urge other objections, but forbear, and hope that the experience of the inventor may convict us of error in those already made.

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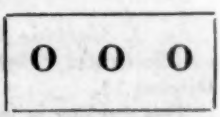
23. An improved mode of constructing *Stereotype Blocks;* Samuel G. Goodrich, Boston, Massachusetts, October 11.

This is a very simple and neat contrivance, for fixing stereotype plates upon a wooden block. A strip of brass, is firmly screwed on one edge of the block, and projects, in two places, above its side, so as to form a lip, to receive one edge of the stereotype plate. A notch is cut on the opposite side of the block, to receive, and allow play to a moveable lip of brass, which is to confine the other edge of the plate. This moveable lip, is perforated with three holes in a row, as in the margin. The two outer holes have wires soldered into them, which project out about two inches, and slip, neatly, into corresponding holes in the edge of the block. From this same edge, projects a screw, which passes through the middle hole; upon this screw a nut is fitted, and is turned, first by the fingers, and then by a small wrench, so as to cause the projecting lip to embrace the plate firmly. A brass plate, the whole length of the block, is screwed upon its edge, so as to cover the notch of the moveable lip. This plate is hollowed at its upper edge, opposite the nut, to allow it to be turned with facility.



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24. Making *Cast Iron Hubs* (or naves) for wheel carriages; William Dickinson, Batavia, Genesee county, New York, October 11.

This hub is cast in five pieces, so formed as to fit together, and present a perfect nave, to receive the spokes and axle.

The patentee describes the whole, but does not specify any particular point which he claims.

Cast iron hubs have been made repeatedly, but it is said that they are too hard for the wood. In mill wheels of cast iron, which move steadily, spokes of wood will continue to fit well, but in carriages, where there are perpetual jolts, the iron has been found to bruise the wood, and cause it soon to work loose. Where water insinuates itself into the mortise, so as to rust the iron, this rust acts upon, and injures the wooden tenon. We have not had sufficient experience of the fact ourselves, but these are the objections urged.

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25. Improved construction of *Pipe Boilers for Steam Engines;* Alden Potter, New York, October 11.

The specification is in the following words:

"The pipes are made with an elbow, the two arms forming a right angle. The small end of one pipe, is received into the large end of another, and the two are held firmly together, by a bolt passing lengthwise through one arm of each pipe, the bolt having a nut and screw at one end, and a head on the other end."

"Each pipe is raised at one end, so as to elevate, successively, every layer, or coil of pipe; thus forming a continued line of pipe, of any required length, similar to the worm of a still, but describing a square, or parallelogram." Alden Potter.

The remainder of the patents for October, will appear in the next number.

Specifications of American Patents.

Specification of an apparatus for Saving Heat, in the process of Combustion. Patented by Steen Anderson Bille, *of New York, Nov.* 8, 1828.

The atmospheric air, necessary for combustion, is generally supplied by means of the draft, resulting from the rarefaction of the air in the fire-place, and, therefore, at the expense of the heat, carried off by the smoke, or foul air, escaping through the chimney. From the specific heat of atmospheric air and steam, at equal temperatures, estimated by volume, being nearly as 50 to 31, it follows that the escape of 50 cubic feet of atmospheric air, at a temperature of 212°, will be nearly equal to the escape of 31 cubic feet of steam of the same temperature, which proportion is still more increased in favour of smoke, on account of the steam and carbonic acid gas formed by the combustion; when in addition to this it is considered, that the atmospheric air, by an elevation of temperature from 32° to 212°, only suffers an expansion of about 37½ per cent. giving a pressure upon the square inch (in proportion to the difference in weight

of the column of air so heated and kept together in the chimney, and the atmospheric air, generally,) of less than half an ounce, upon which pressure the natural draft, as it is called, exclusively depends, it becomes obvious at what immense expense this natural draft is procured, and how very small the mechanical power is, upon which the whole operation depends. The undersigned, therefore, proposes to substitute a direct application of mechanical power, for producing the draft required, endeavouring, at the same time, to a certain extent, to prevent the heat of the smoke from escaping. The draft he proposes to effect, by the application of one or more suction bellows, which, at the same time, will enable the operator to give to the current of air required, any direction he may desire. In thus sucking the smoke from the end of a horizontal chimney, which may, as well as the bellows, for convenience sake, be placed under ground, the smoke will escape through the bellows with as much, and even more regularity, than it does in the ordinary way through an upright chimney. If to this arrangement be added a system of tubes, enclosed in the said horizontal chimney, and so disposed as to communicate with the atmospheric air at the same end of the chimney where the smoke escapes, and with the ash-pit at the other end, while the ash-pit has no other inlet, it is evident that the atmospheric air will enter, and the smoke will escape, in opposite directions, which, naturally, will cause an exchange of temperature from the extent of surface exposed to the operation of mutual contact; where the atmospheric air enters in a cold state, the smoke will escape nearly so, and where the smoke rushes from the fire-place in a hot state, the air will enter the ash-pit heated nearly to the same degree. Thus the greatest portion of the heat of the smoke, otherwise spent, may be saved; the operator will be unrestrained in the construction of his fire-place; he will have it in his power to effect a perfect combustion, and to distribute the fire and heat as he may deem expedient. The anthracite coals, which cannot stand the blast of cold air, will be very eligible under a draft of heated air; the upright chimnies, so disfiguring to steam boats in particular, may be dispensed with, and the foul air let out at any convenient place, at a very reduced temperature. In high pressure steam engines, a similar advantage may be taken from the heat of the steam, altogether lost in the ordinary way of letting it out. The power required for working the bellows, will, from what has been stated above, be very inconsiderable. It must be borne in mind, that the bellows are not intended to compress the air, as in a furnace or forge, to produce intensity of heat, but their object, in the present instance, is barely to imitate the common draft; a mere fanning, or moving of one column of air in its own medium, succeeded by another column, without any effort or attempt whatever at compression; hence, no particular strength is required in the bellows, nor any tightness, that might cause friction; a revolving fan in a circular box, like a shallow vat, but of large diameter, will, in the opinion of the undersigned, be the best adapted form for the purpose, sucking the smoke from an opening behind the fan, on the revolving and hollow draft,

and pushing the smoke before it through a similar opening in the shaft, serving as the inlet, and the top part of it as the outlet, of the smoke, separated by a partition in the shaft, while two slides in the box, placed opposite to one another in the same vertical plane, alternately divide the box, for suction and discharge of the smoke in question. These slides are moved by cranks, in such a way that both close in to the revolving shaft when the fan is in a rectangular position to them; after which, the one in the way of the fan recedes gradually, allowing the fan to pass, and this done, it resumes again its former position, by the time the fan arrives at the opposite rectangular position, and so on alternately. The undersigned claims thus, as his invention, by the application of smoke sucking bellows, in effecting the draft necessary for combustion, so to direct the current of air as to cause a great portion of the heat of the smoke to be absorbed by the air in its passage to the fire-place, from the extent of surface exposed to the operation of mutual contact, while the air and smoke are made to move in opposite directions.

STEEN A. BILLE.

Specification of an improvement in the art of preparing the Back-lint, or Fibres of Hemp, for manufacturing purposes. Patented by ABRAHAM K. SMEDES, *of Lexington, Kentucky, October* 11, 1828.

AFTER separating the back-lint, or fibres, from the wood, or bullen, of the stalk, in an unrotted state, which may be done by hand, but more advantageously by machinery now used for that purpose, the hemp lint, or fibres, or back, to preserve it from tangling, should be loosely twisted, or tied into bundles of a size convenient for handling. It should then be immersed in water, where it should remain until the epidermis, or thin outer membrane shall be destroyed, and until the vesicular or cellular substance which unites the longitudinal fibres, or a part of it, is also destroyed. The back-lint, or fibres, may be immersed in water retained in vats, ponds, cisterns, or other convenient receptacles, or in running streams.

The time required for the preparation or completion of the process, depends, somewhat, on the temperature of the water; a considerable advantage results from heating the water, thereby facilitating the operation. When the water is confined in cisterns, or otherwise, from two to six days will be sufficient for the purpose of destroying the epidermis and part of the cellular substance, which may be ascertained by its becoming loose and slippery to the touch.

The hemp should then be withdrawn, and dried in the common air, or by fire. Let it then be run through the break again, which softens it, and disengages whatever particles of wood or bullen may remain attached to it, and also the cellular substance and epidermis, that may have dried upon it. It may then be applied to the scutcher,

or hacked, which frees it from all the tow and dust, and leaves it in a proper state for market, or use.

The great advantage resulting from the foregoing process, arises out of the ease and facility with which large portions of hemp can be prepared in a small space, and in a manner equal, if not superior, to that which is water rotted on the wood or bullen, and in a great measure, removing the difficulties arising from the unhealthy and offensive effluvia growing out of the decomposition of vegetable matter.

ABRAHAM K. SMEDES.

Specification of an improvement in the mode of operating the rotary Steam Engine for Propelling Vessels, or Machinery, or for any purpose to which steam power is applied, by the application of steam to mercury. Patented by STILLMAN BLAKE, *Providence, Rhode Island, October* 11, 1828.

A BUCKET wheel is constructed, similar to the common bucket water wheel, and either solid, or close, so as to exclude any surrounding fluid from the inside. This wheel is made of iron, or any other strong material.

The wheel is enclosed within a cylindrical box or shell, which is air-tight, and sufficiently large to leave a small space between it and the surface of the wheel, for purposes hereinafter mentioned. This box is also to be made of iron, or some other strong material, in two or more parts, and secured together by bolts.

Into this box, a steam pipe is introduced, and passes down between the wheel and shell, terminating nearly under the centre of the wheel.

From the upper part of the box, an abduction pipe leads to a condenser, where the steam, after having performed its office as below described, is condensed, and leaves nearly a vacuum in the upper part of the cavity between the wheel and box, allowing the wheel to act more advantageously than it otherwise would.

The machine thus constructed, the space or cavity between the wheel and box, is filled with mercury nearly as high as the centre of the wheel. The steam is injected into the mercury, through the steam pipe, and immediately rises into the buckets, nearly under the centre of the wheel, and displaces a portion of the mercury.

The buckets, on one side of the centre of gravity of the wheel, being successively filled, or partly filled with steam, its buoyancy gives motion to the wheel, and the power afforded is in proportion as the weight of the mercury displaced, exceeds that of the steam employed.

Motion is communicated to machinery, or to whatever steam power is applied, by passing the shaft of the wheel through an accurately fitted bearing, in the end of the box or shell.

It is intended that the buckets be filled about one-third part full of

steam at first, and as they ascend, the pressure upon the steam is gradually diminished; it, consequently, expands, and, at the surface, occupies the whole space within the buckets, to the entire exclusion of the mercury, and affording a proportionable increase of power. STILLMAN BLAKE.

Remarks by the Editor.—We have, repeatedly, made known our views respecting the inefficiency of all the rotary steam engines hitherto made, and, we apprehend, that the present attempt will not cause us to relax in its favour. A vast power will be required, to force the iron buckets to wade through so dense a fluid as mercury: in doing this, we suspect more power will be lost than that from the friction of the piston, and all the other parts of the ordinary engine. Highly elastic steam must be used; for should the wheel be six feet in diameter, more than the pressure of an atmosphere will be required to cause the steam to issue from the induction pipe.

A condenser is proposed to be used: there must, of course, be an air-pump, or the condenser will not operate; as no particular plan is given, this, we suppose, is to be constructed in the ordinary way.

Specification of an improvement in the art of Melting and Fusing Glass, and the materials for making and forming glass. Patented by THOMAS W. DYOTT, M. D. *Philadelphia, October* 10, 1828.

THE discovery and improvement consists in using the *resin of pine*, commonly called rosin, as fuel, either alone, or together with other fuel, for the melting and fusing glass, and the materials for making and forming glass.

The advantages of the improvement consists—in the economy of time, in bringing on a melt, two or three hours sooner than can be obtained with wood; in the greater certainty of the quality of the glass; the *bache*, or composing materials, being frequently subjected to a strong heat by a wood fire, yet, in consequence of the quality of the wood, not strong enough to fuse; no heat applied afterwards, will make the glass of good quality, although it may be melted, the salt and pearl ashes being decomposed before the fusing point of heat is brought on. By the use of rosin, this difficulty is obviated, the quality of the fuel being always the same, and unaffected by a damp atmosphere.—In the greater economy of the materials; the pots containing them being frequently broken, and the metal running into the furnace, mixes with the coals and ashes, and becomes black, of less strength, and fifty per centum less in value. In the use of rosin, the glass subjected to such accident, will run out nearly clear, and be as strong as at first.—In a great economy in the cost of fuel, saved principally in the difference of labour in sawing, splitting, oven drying, and preparing the wood; and in the difference of freight and hauling for the rosin; and in the greater

security of the works; the quantities of wood necessarily collected being exposed to accidents by fire, to which the rosin will not be liable.

Thomas W. Dyott.

Specification of an improvement upon the ordinary Machine for Carding Wool. Patented by Don Marcus Bacon, *Huntington, Pennsylvania, Oct.* 10, 1828.

My improvement upon the machine for carding wool, consists in raising the main cylinder of the carding machine, about fourteen inches above the frame, so that a larger portion of its surface may be made to act upon the small cylinders. In the ordinary machine, there are three or four workers, and two strippers: by my improvement, I usually employ seven workers, and three strippers. The seven workers are operated upon by two separate bands or cords, from the same whorl, on the doffer shaft. By this arrangement, three or four of them may, at any time, be stopped, when it is intended to run the wool twice through; or by running the whole number, the work may be completed at one operation. What I claim as my invention is the employment of the additional workers and strippers.

Don M. Bacon.

Specification of a Triangular Measure-case Ruler, for delineating garments with, or by. Patented by Allen Ward, *Philadelphia, October* 11, 1828.

To make a triangular measure-case ruler, for delineating garments, I first procure three strips of tin or other metal plates, with which I form a triangular tube, having the edges of the metal strips turned outside, forming a trough or groove of each strip. I next proceed to solder the three troughs, or grooves, together, which, of course, forms a triangular tube, with the troughs or grooves outwards. I next prepare each side of the triangle for receiving the scales which are to be used therein, by regulating the depth of the groove or trough to the thickness of the scales, and by marking on each side of the triangular tube, some peculiar mark, such as is used in music to denote tunes, flats, sharps, &c.—any character will do to know the scales apart by. I have used a sharp to designate the scale of lengths, or heights, of each customer, and have marked the character on the side where the length scale belongs; and on the second side, I have marked the character of a *la*, or, in other words, a hollow square, which denotes the waist scale; lastly, I have marked the third side of the triangular tube with the character of a natural, which denotes the breast scale; and into these three grooves I slide each respective scale, according to the height and thickness of each customer. I also make some triangular measure-case rulers for delineating garments by, of wood, which answer the same purpose,

but are not so durable. To make a wooden triangular measure-case ruler for delineating garments with, I take a piece of wood, about two feet long and two inches square, of which I form a triangular ruler; in each side of which I plough a dove-tail groove for the scales to slide in. I then put a band of wood or metal round each end, for the twofold or double purpose of holding the marks or characters of each scale, and for a supporter of a wedge with which the scales must be secured, to keep them from sliding back and forth.

ALLEN WARD.

FRANKLIN INSTITUTE.

Report to the Board of Managers on the Fifth Annual Exhibition.

To the Board of Managers of the Franklin Institute of the State of Pennsylvania, for the promotion of the Mechanic Arts, the Committee on Premiums and Exhibitions beg leave respectfully to report:—

THE fifth annual exhibition of the Franklin Institute, was held in pursuance of notice, at the Masonic Hall, on the 8th, 9th, 10th, and 11th days of October, at which time the committee were much gratified to find a rich and varied collection of the products of American skill and ingenuity. The articles presented were not so numerous as at the exhibition in 1826, but displayed, generally, an improvement in style and workmanship, highly creditable to our workmen, and afforded a reasonable hope, that in a few years the advanced state of knowledge, will place the mechanical productions of America, not only beyond the competition of foreigners in our own market, but enable us to enter into a fair competition with them in other countries. Of the 45 premiums offered by the Institute, 20 were claimed by one or more competitors, of which three remain under advisement, and 9 were awarded by the committee to successful competitors. Of the remainder, several were withheld, because the condition of the proposal was not adhered to.

Premium No. 4—For the best specimen of Annealed Cast Iron, is awarded to Seth Boyden, of Newark, New Jersey, for specimen No. 163, being an assortment of buckles, bits, and other castings, remarkable for their smoothness and malleability.

This is the first attempt in this country to anneal cast iron for general purposes, that has come under the knowledge of the committee, and the success attending it, fully entitles the maker to the silver medal.

Premium No. 12—To the inventor of the best constructed Furnace and Boiler, superior to any now in use, for consuming anthracite in generating steam. This premium has been claimed, but the award is still under advisement.

Premium No. 13—To the maker of the best Fire Bricks. The

award of this premium is left open, in accordance with the terms of the proposal, until the samples shall be sufficiently tested.

Premium No. 14—To the maker of the best Currying Knives, equal to the best now in use. This premium was claimed by two competitors, each furnished with very satisfactory certificates, as to the quality of their knives. John Shugart & Co. of Chambersburg, and Jacob Barrick, of the same place. As curriers' knives are implements which require a peculiar temper, very difficult to attain, and which can only be judged of by experiment, your committee accept the suggestion of the judges, and suspend the award of the premium until the knives can be fairly tested and compared, by a special committee, appointed for that purpose. As soon as their report is received, it shall be made known.

Premium No. 16—For the best specimen of Japanned Waiters or Trays, made and japanned in Pennsylvania, is awarded to John V. Blackmore, of Philadelphia, for specimens Nos. 71 and 72, being two dozen of waiters made by him, of a quality not inferior to the imported. The committee regret that the specimens presented by William Nash, of Philadelphia, were deposited too late to be referred to the judges; they could not, therefore, enter into competition with the above.

Premium No. 17—To the maker of the best Surveyor's Instrument, is awarded to Stancliff & Draper, of Philadelphia, for specimen No. 316, being an engineer's level, provided with Mr. William Strickland's divided horizontal circle. This instrument is remarkable for the beauty of its workmanship, and the accuracy with which it is divided, and fully entitles its ingenious makers to the silver medal.

Premium No. 20—For the best Porcelain made in the United States, gilt, painted, and plain—"one hundred pieces must be exhibited;" is awarded to William E. Tucker, of Philadelphia, for specimen No. 253, being an assortment of porcelain, of first and second choice.

In awarding this premium, the committee feel pleasure in noticing the great improvement which has taken place in the manufacture of this beautiful and interesting product. The judges report that they have compared the sample, called technically "first choice," with the best specimens of French China, and found it superior in whiteness, and the gilding well done. The same remark applies to the painting, with some exceptions; this part of the process being still susceptible of some improvement. The committee recommend this "first choice" to the public as of a quality not easily to be surpassed; and award to the maker the silver medal.

Premium No. 27—For the best specimen of Stair Carpeting, in imitation of Venetian, is awarded to James B. M'Fee, of Philadelphia, for specimens No. 96 and 97, two pieces stair and entry carpet, which reflect great credit on the maker.

Premium No. 29—To the maker of the best specimen of Calicoes or Prints, for ladies' dresses, made in the United States, is awarded to the Merrimac Manufacturing Company, for specimen No. 149. Prints were deposited, also, by the Taunton Manufac-

turing Company, and from the Warren Factory, near Baltimore; the latter low priced goods. It is but justice to all parties, to state, that the judges remarked the great improvement that had taken place in printed goods since the last exhibition. They had great difficulty in deciding whether the Merrimac or Taunton goods, should have the preference, both being well executed, and of brilliant colours. After some hesitation, they awarded to the Merrimac Company the silver medal.

Premium No. 35—To the maker of the best Sofa, is awarded to Anthony G. Quervelle, for specimen No. 55, being the most complete and best finished of any exhibited.

Premium No. 37—To the maker of the best Chairs, one dozen to be exhibited; is awarded to William Hancock, of Boston, for specimen No. 33, being one dozen mahogany chairs, well framed and finished; remarkable for the excellence of the carving, which was clean, bold, and in good taste.

Premium No. 45—To the pupil of the High School who shall execute and exhibit the best specimen of perspective drawing from machinery; is awarded to Robert P. Warner, for specimen 282; being a drawing of an air-pump, the best exhibited.

In addition to the premiums awarded to those competitors who claimed, under the proposal issued by the Institute, your committee, in pursuance of authority to grant premiums and special notices to such specimens exhibited, as may be worthy of most compliment, either for excellence of workmanship, or ingenuity, or other peculiar circumstances, have awarded:

To James Devoe, of Kensington, a silver medal for two models of steam engines, made by him. The maker of these models is a lad, apprentice to John Walcham of Globe Mill Factory, and they were made at his leisure hours. The committee have not awarded this premium with any view to the intrinsic merit of the work; but they deem it within the province of the Franklin Institute, to encourage and reward examples of industry, perseverance, or ingenuity, among our rising mechanics. These models evinced a talent uncommon in so young a lad.

To S. P. Wetherill & Co. Philadelphia, for two pigs of lead; being a part of 1000 pigs, the product of their Perkiomen mines, smelted by them. The quality of this lead has been fairly tested by being manufactured into white lead. After a series of years of expensive and fruitless attempts to smelt this ore, these gentlemen have at last succeeded in rendering available, another product from the inexhaustible mineral resources of Pennsylvania. A silver medal is awarded.

The committee also award the silver medal to Wm. & T. H. Day, of Philadelphia, for specimens 14, being an assortment of door locks. These locks, of which the makers are, also, the inventors, were good and well finished, displaying much ingenuity in their construction; all of them were safety locks, presenting almost insurmountable obstacles to the pick-locks: a particular description will be given in the detailed report of the exhibition.

Ten pieces of Flannel were presented from the Yantic Factory, Connecticut. The judges reported them to be of a very superior quality, and the committee adopt their suggestion, and award to the maker, a silver medal.

To Lloyd Mifflin, for No. 201, hearth rugs wove by him. These rugs were the first produce of machinery, invented by him, entirely upon new principles. The rugs were well made and substantial, and bid fair to rival the best imported article. The silver medal is awarded.

To Messrs. Terhooven, for a sample of pins, made and presented by them; the pins were, in most part, of excellent quality, and reflect much credit on the makers. For the introduction of this useful and important branch of manufacture, the committee award the silver medal.

Marble mantels from the manufactories of Tennant & Highlands, P. Fritz, J. Struthers, and S. & J. Jardin, fully sustaining the high reputation of Philadelphia workmanship, were presented. Those from Tennant & Highlands, were much admired for the taste of the design, and pleasing appearance. Those of American and foreign, and American marble, made by P. Fritz, were adjudged to be the best in point of workmanship. The next best, a pair of American and foreign, by J. Struthers. Honorary mention was awarded.

The Franklin Institute has never been favoured with a more splendid display of pianos, than at this exhibition. Thirteen were presented from E. Pommer, C. F. L. Albright, J. J. Meckley, Loud & Brothers, S. Sweitzer, and —— Myers, of Philadelphia, Curtis & Gilbert, and A. Babcock, of Boston. As no premium was offered for pianos, presented at this exhibition, the committee forbear, at present, making any distinction; but in their detailed report, to be presented in a few days, a description of each, with their merits, may be expected.

To Stanley & Co. of Baltimore, an honorary mention is awarded, for 3 pieces mixed sattinets; these goods were of very superior quality, and would have received the premium, had the conditions of the proposal been complied with.

To James B. M'Fee and Groves & Fleming, of Philadelphia, an honorary mention is awarded, for their excellent samples of ticking; both very superior articles.

Honorary mention is also awarded to —— Clapp, Leicester, Mass. for 4 pieces mixed cloths, of excellent quality for the price, and to James M. Robbins, of Watertown, and Sheppard's woollen manufactory, Northampton, for 4 pieces blue, and 4 pieces black broadcloth, being the best exhibited. These cloths were not entitled to the premium, by the terms offered, there being a standing rule of the Institute, that no premium will be awarded, unless they are superior to any that have been heretofore presented. These cloths are represented by the judges, to be well made and substantial, of good fast colour, and handsomely dressed. It is but justice to remark, that the cloths heretofore exhibited, were sold at 10 and 11 dollars, while the above 8 pieces were offered at 7 dollars.

Honorary mention is also awarded to Magee & Tabor, for a set of gig harness, made by them, of splendid workmanship, unequalled by any the judges had ever seen. These gentlemen obtained a premium last year. Also, to Leadbeater & Sons, for a splendid hanging astral lamp, with four burners; a specimen of work highly creditable to them. The committee regret these gentlemen did not make it of a size to claim the premium, which the quality of the work would have entitled them to do.

The committee further award honorary mention, to William Rowland, of Philadelphia, for his very superior mill, pit, and cross cut saws, of excellent quality, well ground and finished.

The committee further beg leave, especially, to notice the Pharmaceutical preparations of G. W. Carpenter, whose improvements in the science of pharmacy, reflect great credit on him, and have proved highly useful to the public.

Also, the chemical preparations and colours from the Maryland Chemical Company, to whom our manufacturers are much indebted, for relieving them from a dependence on the importers, for articles which are indispensable. The bleaching salts was remarked as being of excellent quality, and preferred, by many, to the celebrated bleaching salt of Tennant, of Glasgow. Also, carbonate of magnesia, and calcined magnesia, made from the purest sulphate of magnesia, washed by steam, appeared nearly chemically pure; and many other specimens of equal quality.

Cast Iron Medals, from Jones, Keim & Co. Windsor Furnace, near Hamburg, Penn.; the most perfect specimens of castings known of this country's production, and rivalling the most splendid Berlin medals.

Fancy articles, from William Tait, Philadelphia, and Water Colours, from George C. Osborne, of Philadelphia, evinced much improvement in both branches of manufacture, and were highly creditable.

Of the Sole Leather, from Ashburner & Son, and W. & I. Pritchett, the committee take much pleasure in stating, that they were judged to be of the best of the kind, and fully sustain the character so long held by the Philadelphia tanners.

The committee would further particularly notice, Grates, from Lloyd & Son, —— Jackson, and —— Mifflin, all of which were well made and of good workmanship. The design of No. 132, from Lloyd's, was particularly pleasing.

Brass Hinges, &c. from William Garret, were adjudged well finished, and creditable articles.

The committee cannot close this report without tendering their thanks to the gentlemen who so ably fulfilled the arduous duties of the committee of arrangement. To them the Institute and public are indebted, for the splendid exhibition they have just witnessed; and to them much praise is due for the neat and careful manner in which the articles were displayed.

In closing the report of the Fifth Exhibition, the committee must again throw themselves on the indulgence of the public, to pardon any errors into which they may have fallen. If any injustice has

been done, they feel confident it will be attributed to causes without their control. The constant aim of the committee has been, equal justice and impartiality to all. They are aware that many articles, deserving special notice, have been omitted in this preliminary report. Respecting such they give the assurance, that in a few days, they will present a detailed report of all which were exhibited, with their respective merits.

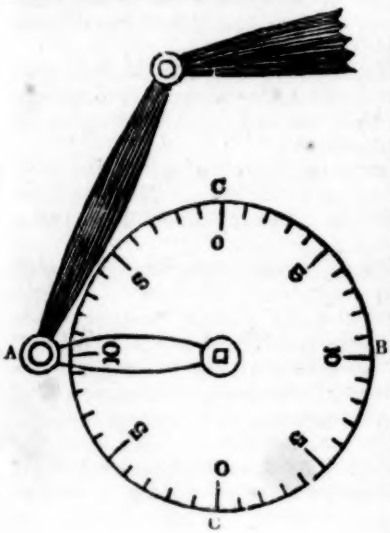
Saumel V. Merrick,
James Ronaldson,
Thos. Fletcher,
Adam Ramage,
M. W. Baldwin,
M. D. Lewis,
Isaiah Lukens,
Christian Gobrecht,
Committee on Premiums and Exhibitions.

Observations on the comparative difference in the effective power of Steam, as applied to the Rotary, and Reciprocating Engine.

TO THE EDITOR OF THE FRANKLIN JOURNAL.

Sir,—Having often enquired the difference in effect between a reciprocating engine and a rotary one, without being satisfactorily answered, I lately endeavoured to solve the problem myself. I have sent you the result of my labour: should my method of calculation be obscure, and the conclusion erroneous, I need only put you in mind, that you have promised to destroy, to correct, or to expunge, with tenderness, the communications of those who are less accustomed to handle a pen, than a

Hammer.



A reciprocating steam engine, whose cylinder is 2 feet long and one foot in diameter, will describe, by its crank, a circle 2 feet in diameter, which will require a double stroke of the piston, and so consume a column of steam 4 feet long and one foot in diameter; but the whole power of the steam will only be exerted at two points in the circle, viz. at A and B, and as the crank recedes from these, the power decreases till it reaches C, C, the dead points, where the steam is altogether of no avail; and on the contrary, as it approaches A, B, the power increases till it arrives at its maximum, at those places. Now let us suppose the circle divided as in

the diagram, then each figure will express the power of the engine at the time the crank is opposite to it: so, also, would the gross amount of all the figures united, express the power of the engine, during one revolution of the crank, or a double stroke of the piston: may we not state it thus?

Power 200 (the amount of figures) produced by a column of steam 4 feet by 1 foot.

Now suppose a rotative engine of the *same diameter as the circle which the crank above, describes, (viz. 2 feet) and the area of whose piston is the same as the one above-mentioned;* then, (leaving friction, &c. &c. out of the question) the force of such an engine would be the same in all points of the circle, as the reciprocating one at A and B; consequently, each figure would represent 10, and the whole united, 400, or just double the power produced by the reciprocating engine.

But then the quantity of steam consumed by the latter, will be considerably more than the former, viz. a column of steam 6.2832 the circumference by 1 foot: the account will then stand thus, the

Reciprocating engine, power 200, steam 4.
Rotary do. power 400, steam 6.2832.

then if 6.2832, the steam consumed in the rotary, produce power 400, what will 4, the steam used in the reciprocating one, produce? the answer is, 254; so that, if this calculation be not visionary, a rotative engine is to a reciprocating one, the quantity of steam consumed being equal, as 254 is to 200, or *one-fourth* more effective.

New York, October 21, 1828.

Remarks by the Editor.—The practical difficulties which have attended every plan hitherto attempted for constructing a rotary engine, seem to us to render any comparison between it and the reciprocating, a task of no easy performance. Which of the numerous rotary engines shall we adopt, as the subject for comparison? In some of them, condensation has been attempted; in others, the high pressure principle, without condensation, has been essayed; in all of them, the difficulties of packing, of constructing the valves, of letting the steam on and off, &c. &c. are sources of immense loss of power. The fact is, that a good rotary engine, or even one whose power can be calculated, is, in our opinion, a mere theoretical being, whilst the reciprocating can be correctly estimated. In a rotary engine, the steam is never cut off; in the reciprocating, it may, and ought to be, cut off long before the stroke of the piston is completed, depending upon the elasticity of the steam employed. These are mere hints, but we can give no more, as the subject would demand more time and space, than we have to spare.

Remarks on the article upon Perpetual Motion, in the last number of the Franklin Journal, by a Correspondent.

TO THE EDITOR OF THE FRANKLIN JOURNAL.

Sir,—I have been much gratified by the article in your Journal for November, on *Perpetual Motion*, because the information there given of some of the most plausible schemes for producing it, is, I think, equally with the demonstration of their futility, calculated to awake many active and ingenious minds from their day dreams, which, however, if they did not cause much loss of money or valuable time in the pursuit of an *ignis fatuus*, might be an innocent, and not always profitless amusement.

Great credit is often claimed for our countrymen's alleged superior ingenuity and inventive powers. I am not disposed to dispute the claim: it is at once accounted for in the peculiar circumstances of a new and thinly settled country, where every farmer is urged, by necessity, to contrivance for the supply of constantly recurring wants. This evidently conduces to form that character for acuteness and ingenuity, among our yeomanry, which would be seldom found on the farms, if in the workshops, of Europe. But that scientific and practical knowledge of mechanics, which is essential to the invention of a good machine, is equally rare among us. These two causes, both operate to produce, and are manifest in, the multifarious inventions and machines that crowd the shelves, and the records, of the patent office; and in the inquiry, why so very few of them, though new to the patentee, are, in reality, original and valuable, we shall, probably, find little to gratify our national pride; for I believe it must be allowed, that most of them evince a deficiency of mechanical science, or an ignorance of the progress made in it.

I desire not to depreciate the character of our nation for natural or acquired talent, but to show the need there is for more full and correct information to direct it usefully in the department of mechanics; and I believe the exhibition you have given of the futile attempts to produce a perpetual motion, will be useful as a corrective of the evil I have alluded to, and that it might be profitably extended to other subjects.

But even the pursuit after perpetual motion, hopeless as it is, may not be considered entirely vain. As an exercise of the mind and of the inventive faculties, it is not useless, as it may, occasionally, lead to useful modifications of machinery. As an instance of this, I here submit to you, a plan suggested by an ingenious friend of mine, several years ago, for projecting levers from the centre and on one side of wheels, which was new to me, and if so to you, may be considered worth insertion in the Journal, as an appendix to your remarks on perpetual motion.

The diagrams annexed, exhibit the plan, and need little explanation.

Fig. 1.

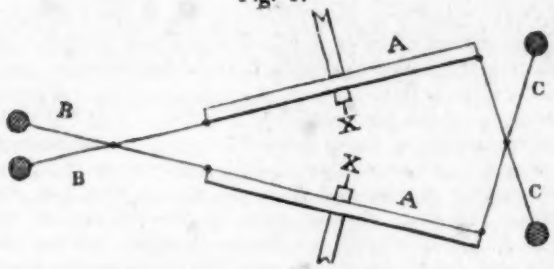
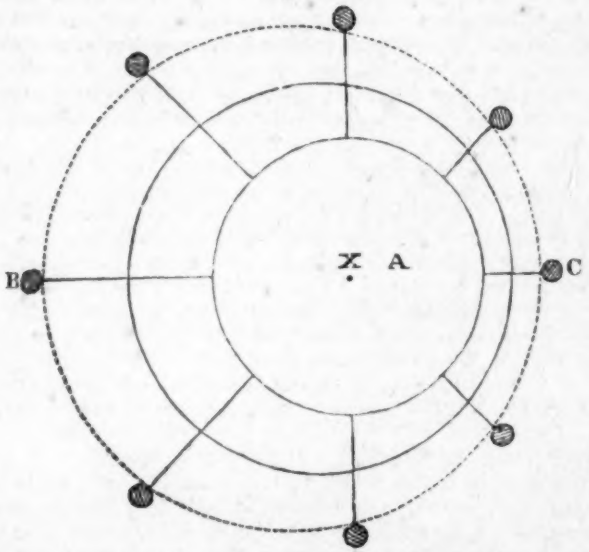


Fig. 1. is a perpendicular view. A, A, are two vertical wheels, placed diagonally, and revolving on the axes X, X. The levers or arms B, B, and C, C, are hinged at the peripheries of the wheels, and are jointed near their centres. By rotation of the wheels, the arms B, B, are projected from the centre of motion, while the arms C, C, are drawn in.

Fig. 2.



It is plain, that a series of arms, as shown in the horizontal view of one of the wheels, Fig. 2, will produce an eccentric motion, causing the weights at their ends, apparently, to preponderate on the side B. It is obvious, also, that a ring attached to the joints of the arms, would form an eccentric, applicable, perhaps, to some useful mechanical purpose. BELIDOR.

November 15, 1828.

Notice respecting Steam Carriages. By the Editor.

We have several times adverted to the subject of steam carriages, and have ever expressed the opinion that, upon ordinary roads, they will not be made to fulfil the conditions required, for the conveyance of passengers, or the transportation of goods. For the convenient and safe application of steam power, a degree of uniformity of motion is requisite, which we think it impossible to obtain, where there are considerable ascents and descents, stones, ruts, and other obstructions. We have inserted from the English Journals, several notices of attempts to overcome these difficulties, and we have continued to seek for all the intelligence that has been published upon the subject; but the articles which have come under our notice, have been so contradictory, that we were only likely to mislead our readers by their insertion. Of late, Gurney's steam carriage appears to have taken the lead, in arresting public attention, and some of the journalists have spoken of it as completely successful, whilst others have represented it as an experiment altogether unpromising in its character. In the London Journal of Arts and Sciences, the editors, Messrs. Newton and Partington, say, "to several inquiries as to the progress of the steam coach, we are compelled to reply, that there has not yet been any carriage exhibited, either publicly, or privately, which warrants us in saying that the object is likely to be effected." The proprietors, however, if we credit the representations published by them, or their friends, appear quite confident of success, and, indeed, claim to have already succeeded.

We have been presented by Turner Camac, Esq. of Philadelphia, with a large geometrical drawing of this carriage, (Gurney's) in plan and section. This drawing was brought over by Lieut. Col. Camac of the British army, a brother to the first named gentleman. We have conversed with the colonel, who had ridden a considerable distance in Gurney's carriage. This trial coach was sufficiently large to carry six passengers inside; besides these, there were eight persons on the outside; two of whom were employed in the management of the vehicle, the others were passengers. The general impressions of Colonel Camac, as regards the coach, are favourable, but he apprehends that the obstructions from rough, or deep roads, and steep ascents, will with difficulty be overcome, although on level and good roads, the travelling was pleasant and rapid.

In public trials of this description, it is not the wish, nor is it the business, of projectors, to be defeated in what they attempt, and the experiments are, therefore, made in the most favourable situations, where apparent perfect success is well calculated to lead a very large majority of the spectators into error; and this we apprehend has been the case in the present instance.

Much skill has, of course, been employed in the structure, as it has been long in hand, and under the direction of men of ingenuity, who have profited by their own observations, and those of others, as successive difficulties have been encountered. We do not, however, in the present state of our knowledge, think it necessary to give an

engraved representation of the engine and carriage. When it shall have carried passengers, in successive trips, on a route of twenty miles, where the usual varieties of hill and dale must have been encountered, its structure and merits shall be fully exhibited.

We will, at present, briefly remark, that the two steam cylinders, which work two cranks on the axle of the hind wheels, are placed under the fore part of the carriage; the boiler, which is tubular, is in the boot, behind, and is encased in such a way as to radiate but little heat; there is a tank below the carriage, for containing a supply of water; there are six wheels, the two foremost being turned by a handle, under the management of the guide, to direct the carriage. As a chimney of sufficient height, to procure the requisite draft, could not be used, a blower, or fan, with revolving vanes, is employed. To aid in ascending hills, there are propellers, which are to operate like poles in propelling a boat; and there is a drag, or brake, to regulate the velocity, in descending.

On Colouring Engravings, and on Coloured Inks.

TRANSLATED FOR THE FRANKLIN JOURNAL.

[From the *Journal des Connoisance Usuelles.*]

The art of colouring engravings, is very easily acquired, and can be practised by persons who are unacquainted with drawing. Only so much skill is necessary, in the commencement, as shall suffice for the imitation of good models; and a little practice will then give facility of execution, and improve the taste. As this art is very amusing to children, and furnishes an agreeable occupation to females, we extract from the *Encyclopedia Moderne*, some directions for its performance.

The colouring of books of engravings, and of those which ornament the volumes in our libraries, are usually executed by women; it consists in giving, by means of the pencil, that colouring to printed engravings, which shall correspond with the native hues of the objects represented. This art has, in modern times, arrived at great perfection, as may be seen in various beautiful collections of flowers and plants, which have been presented to us by those who have attained the greatest skill in this department. The magnificent collection of roses by Redouté; the medical Flora of the Antilles by Décourtils, and many others, might be cited as examples.

This colouring is a kind of bodiless painting, or rather of washed drawing; the tints employed, ought to be transparent, and thin; those which have the least body, are, therefore, chosen; or rather colours are preferred, which are without any, as those which are obtained from flowers, and which are found to be the most suitable for this kind of work. When it is necessary to take such as are more gross, they are repeatedly washed, so as eventually to procure the finer particles only.

The blue petals of the iris, afford a green fecula; but this, however, is less beautiful than that obtained from the ripe berries of

buckthorn, and which is called sap-green. The berries of the dwarf alder, afford a violet colour, which may be changed to blue, by the addition of alum. There are many other berries, which afford coloured juices; such as the gooseberry, the cherry, the raspberry, the seeds of madder, and the elder. A decoction of the woods is sometimes used, such as that of fustic, and of logwood. A yellow is prepared by gamboge and water; a crimson, by carmine and weak gum water; the colour of water, by verditer combined with cream of tartar; blue, by indigo and alum, or by Prussian blue; a fawn colour, by tormentil root; and black, by uniting sulphate of iron (copperas) with this last, or by using Indian ink.

All the coloured juices of which we have spoken, may be brought into the form of cakes; nothing more is necessary, but to add to them, when boiled, a portion of fish glue, and, afterwards, to allow them to dry in moulds made of card, which have been rubbed over with butter, or with grease, to prevent their adhesion; by this means, they acquire the consistence of Indian ink, and may be used in the same way.

These colours, when concentrated, may be employed as coloured inks. Among these, one only is in common use in commercial transactions, namely, red ink. Occasionally, green and yellow inks are used, and, sometimes, though more rarely, those of other colours. The following is the composition of some of these, which, when properly diluted, serve well for the colouring of engravings.

Red Ink.—The mode of preparing this ink, recommended by M. de Ribaucourt: infuse 4 ounces of ground Brazil wood in vinegar, for three days; then heat it to the boiling point, and keep it for an hour at that temperature, after which, it must be filtrated. Whilst hot, dissolve in it one-third of an ounce of gum arabic, and the same quantity of sugar, and of alum; allow it to cool, and put it into well stopped bottles.

An ink of a still more beautiful shade, may be made with a decoction of cochineal, to which ammonia is to be added.

The most beautiful of all the red inks, is made by a solution of carmine in liquid ammonia, allowing the excess of the alkali to evaporate, and adding a small portion of colourless gum arabic.

Green Ink.—Klaprotti's recipe for making a beautiful green ink, is the following: boil two parts of verdegris, and one of cream of tartar, in eight parts of water, until it is reduced to one-half. Strain it through a cloth, allow it to cool, and then bottle it.

Yellow Ink.—In a quart of boiling water, dissolve an ounce of alum; add half a pound of French berries, (*Graines d'Avignon;*) keep the mixture at the boiling point for an hour, strain the liquid, and dissolve in it a little more than a quarter of an ounce of gum arabic.

By following the same process, but substituting a much smaller quantity of saffron for the French berries, a much more beautiful yellow will be obtained. A still more durable colour may be made from gamboge, by merely dissolving it in water, until it is of the shade required.

By means of concentrated solutions of the greater number of colouring substances, inks of every shade may be prepared; a portion of gum is, in general, required, to suspend the colouring matter; and, sometimes, corrosive sublimate must be added to prevent mouldiness.

On an improved mode of heating Fluids, to make Vegetable Extracts, boil Sugar, raise high pressure Steam, &c.

Mr. G. R. Porter, in connexion with Mr. J. T. Beale, Engineer, of Church lane, Whitechapel, have just patented an invention, which promises to become of most extensive and beneficial use in the arts. It consists in the application of volatile fluids, such as the essential oil or spirit of turpentine, the spirit of coal tar, &c. which are put into a boiler, in which is also inserted another boiler, to contain the matter to be heated, and leaving a space beneath and around the inner vessel; an iron elbow pipe, of twenty feet in length, with a valve at top, opening upwards, is also inserted into the bottom of the external boiler. This apparatus is abundantly simple, and the arrangement considerably resembles the apparatus employed at Apothecaries' Hall, and other establishments, for making extracts, distilling, &c. by high pressure steam; but with this very considerable advantage over the employment of steam, that, instead of running the risk of the steam-boiler bursting, as is too commonly the case, these volatile fluids, the instant they are volatilized by the action of the heat of the fire made under the boiler, on coming into contact with the inner vessel, are as instantly condensed, and fall back again in drops, or even in a small stream, to be reheated; at the same time giving off their heat most rapidly, to the fluid contained in the inner boiler. Nor has the volatile fluid any tendency to escape from between the two vessels, the iron elbow-pipe and valve being merely adopted as a measure of precaution, and the upper part of this pipe being hardly heated at all, when the apparatus is at work.

The Editor has lately seen an apparatus of this kind, at Messrs. Winstanley's, chemists, in the Poultry, making vegetable extracts; and although the extract then under process, had become thick, yet it continued boiling with considerable briskness, and without any danger of being scorched, at a temperature of 220°; the volatile fluid employed, being the spirit of coal tar.

We understand that a sugar-pan, or teache, is set up at Messrs. Pontifex's copper-works, in Whitechapel, where the process of boiling sugar under this new process, may be seen; and also that Mr. Beale employs it, at his engine manufactory, to generate high pressure steam for his rotary steam engine.

Several different degrees of temperature may be exactly maintained, by means of this new process, depending upon the temperature at which the essential oils have been distilled: thus we have

heard of one as high as between three and four hundred degrees; and of another which requires a degree of heat to volatilize it, as great as that required to melt zinc! [*Tech. Rep.*

On a singular Egyptian method of Ornamenting Wood.

The editor has lately been favoured by a friend returned from his travels in Egypt, with a part of a coarse comb, made of a dark brown coloured wood, and ornamented with brilliantly shining metallic figures, formed of circles and straight lines; and which, on examination, proved to be narrow grooves, filled up with an amalgam of mercury and tin in the crystallized state, such as is used in silvering looking-glasses; it just retaining a sufficient degree of consistency to remain in the grooves, and thus the brilliant metallic surface was continually renewed whenever the comb was rubbed, or wiped clean.

Other parts of it were ornamented with bits of thin green glass, with leaf brass laid beneath them, and let into shallow circular holes made in the comb to receive them.

The whole forms a curious specimen of rude and peculiar workmanship. [*ib.*

On ornamenting Wood in the Lathe.

Many years since, the editor was instructed in a method of ornamenting white wood in the lathe, and which he has never seen described in any of the numerous works published on the arts.

The method consists in forming a composition of shellac and rosin, to which various coloured powders are added, whilst the composition is in the melted state; such, for instance, as red-lead, vermilion, Prussian blue, indigo, king's yellow, yellow ochre, lamp-black, &c.; each colour being formed into a separate mass or ball, to be used in the following manner.

When the wood is turned into shape, and running swiftly round in the lathe, a ball of the desired colour is held against it, in the place desired to be coloured; the heat produced by the friction quickly melts a portion of the coloured mass, which adheres to the wood, and is then to be spread and diffused over its surface, and polished, by means of a piece of cork held against it. The edges of the coloured rings are then brought into an accurately defined shape by means of the turning tool; and then another colour may be applied to the wood in a similar manner, and so on, until the designed effect is produced.

We have frequently seen colours applied in a coarse manner to

wood in the lathe; these are, however, mixed in a softer composition, of which bees'-wax forms the chief part, and are by no means capable of being applied in the delicate manner above-mentioned.

Tunbridge ware may, no doubt, be thus ornamented in the lathe with considerable advantage. [*ib.*

LIST OF ENGLISH PATENTS.

List of Patents for New Inventions, which passed the Great Seal, from June 4th, to August 19th, 1828.

To Baron Charles Wetherstedt, for his invention of a liquid or composition for water-proofing or strengthening leather—June 4.

To Richard Witty, engineer, for his having invented or found out certain improvements in apparatus, for making and supplying coal gas for useful purposes—June 10.

To Edmond Gibson Athetley, Esq., for his having invented an apparatus, for a method of generating power applicable to various purposes—June 12.

To William Stratchan, manufacturer, for his having invented or found out an improvement in the making or manufacturing of alum —June 12.

To John Bartlett, shoe-thread manufacturer, for his invention of a new and improved method or methods, or manufacturing process, for preparing flax, thread, or yarn, for use in the manufacture of boots, shoes, saddlery, and of sails, and other cloths and bagging—June 16.

To George Johnson Young, iron founder, for his invention of a machine, whereby an additional and improved purchase or power will be given, in working ships' windlasses and capstans—June 21.

To Samuel Pratt, camp equipage maker, for his invention of certain improvements on elastic beds, cushions, seats, pads, and other articles of that kind—June 25.

To John Baring, merchant, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of a new and improved mode of making or manufacturing machines, for cutting fur from skins for the use of hatters, to be called "cant twist blades fur cutter"—July 3.

To John Johnston Isaac, engineer, for his invention of improvements in propelling vessels, boats, and other floating bodies—July 5.

To Thomas Revis, watchmaker, for his invention of an improved method of lifting weights—July 10.

To John Hawks, iron manufacturer, for his having found out and invented an improvement in the construction of ships' cable and hawser chains—July 10.

To John Henry Anthony Gunther, piano forte manufacturer, for his invention of certain improvements on piano fortes—July 10.

To William Muller, captain of our German legion, for his having

invented an instrument or apparatus, for the purpose of teaching or instructing in mathematical geography, astronomy, and other sciences, for the use of resolving problems in navigation, spherics, and other sciences—July 10.

To Benjamin Rider, hat tip manufacturer, for his invention of certain improvements in the manufacture of hats, which he intends to denominate Rider's patent hat tip—July 17.

To Joseph Jones, gentleman, for his invention of an improvement in certain parts of the process of smelting, or obtaining metallic copper from copper ore—July 17.

To Anton Bernhard, engineer, for a method, principle, or apparatus, for raising of water or other fluids—July 24.

To Robert Wornum, piano-forte maker, for certain improvements on upright piano-fortes—July 24.

To Joseph Clisild Daniell, clothier, for certain improvements applicable to the manufacturing and preparing of woollen cloth—August 5.

To John Lane Higgins, gentleman, for certain improvements on wheel carriages—August 11.

To William Mencke, gentleman, for certain improvements in preparing materials for, and in the making or manufacturing of bricks —August 11.

To Lewis Roper Fitzmaurice, master in the Royal navy, for improvements on ships' and other pumps, which improvements are also applicable by certain alterations to turning lathes and other purposes —August 11.

To William Grisenthwaite, Esq., for a new process for making sulphate of magnesia, commonly called epsom salts—August 11.

To Henry Maxwell, spur maker, for an improvement in spring spur sockets—August 13.

To Thomas Stirling, for certain improvements in filtering apparatus—August 16.

To Benjamin Matthew Payne, scale maker, for certain improvements on weighing machines—August 18.

To Edward Barnard, clothier, for certain improvements in weaving and preparing cloth—August 19.

To Philip Foxwell, clothier, William Clark, clothier, and Benjamin Clark, cloth-dresser, for certain improvements on machinery, for shearing, cropping, or cutting and finishing woollen, and other cloths and cassimeres.—August 19.

To William Sharp, cloth spinner, for certain improvements in machines for spinning or roving of cloth, silk, wool, or other fibrous substances—August 19.

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